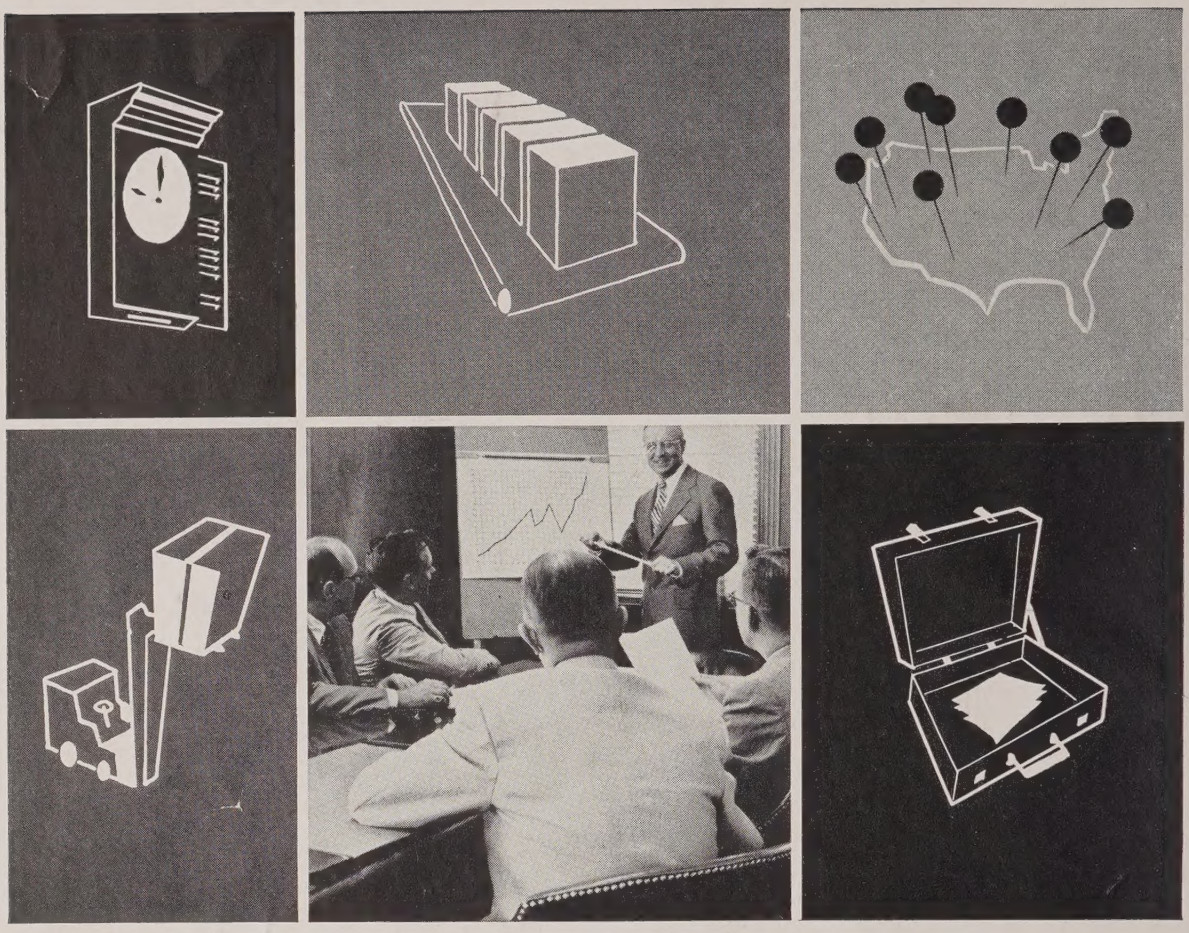
July 1961

BUSINESS AUTOMATION

Don't Be ... *nes*

Page 22



NOW! A LOW-COST WAY TO AUTOMATE MANAGEMENT CONTROLS

KEYSORT® DATA PROCESSING

Fast, accurate management controls are at your fingertips with low-cost Keysort Data Processing.

Keysort Data Processing is being used by hundreds of businesses for fast reports on inventory, order and sales analysis, job and labor costing, and other vital data in every phase of management control.

Fits any size plant

Keysort has many advantages. No restrictive procedures; minimum training, great economy, simplicity of installation and operation. In fact, Keysort is the only automated data processing system flexible enough to fit your business as it stands and as it grows. And at a cost well within your company's budget.

Cuts clerical work

With Keysort you use easy-to-handle punched cards—mechanically created for rapid sorting and classification. Figures are automatically tabulated, results summarized direct to reports, giving you the meaningful on-time information you need for complete control of your business and profits.

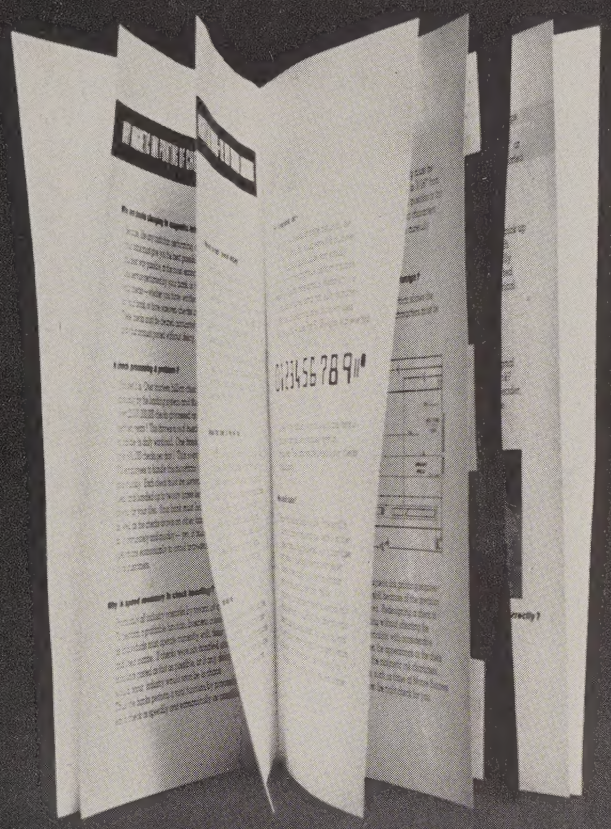
Ask us for case histories

Your Royal McBee Data Processing Systems Representative has had a wealth of experience in solving management control problems. Working with you, with your systems and procedure experts, he can offer helpful advice about a low-cost Keysort system tailored to your individual requirements. Call him, or write us at Port Chester, N. Y.—indicating the applications in which you are interested—and we will be happy to supply you with case histories from our files.

ROYAL McBEE *corporation*

NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION

For More Information Circle Reader Service Card No. 151



All about MAGNETIC INK PRINTING ⑆1234567890⑈
⑆1234567 Send for a free copy of this MOORE booklet

Want to know about this new system of coding checks? Do you wonder what the effect of magnetic ink printing will be on your checks and their design? Moore's short readable booklet answers questions such as:

Why are banks changing to Magnetic Ink Printing? Will 'character sensing' soon govern the handling of all checks? Are there exact specifications for placing and printing coded information? What new machines are introduced into check processing? Even if you aren't interested now, should you take steps to avoid needless expense in check printing later?

This interesting Question & Answer booklet is yours for the asking—just send the coupon at right.

MBA

SEND THIS COUPON TO:

Moore Business Forms, Inc.
900 Buffalo Avenue
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Please send me, without obligation, a copy of your new booklet on Magnetic Ink Printing.

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Company_____

Street_____

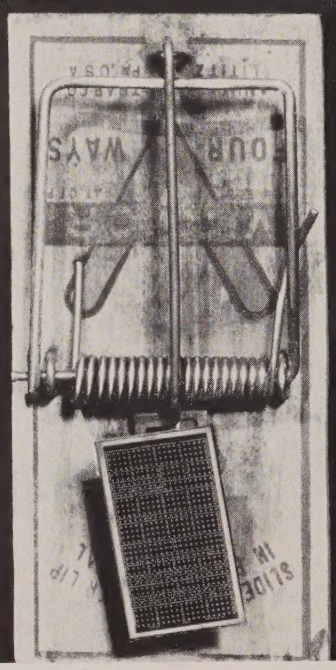
City_____ Zone____ State_____

Build control with . . .

MOORE BUSINESS FORMS

For More Information Circle Reader Service Card No. 152

PANEL BAIT!



We admit it. Competition in the panel business is keen. Still, we haven't had to put out any "cheese" to bait our customers. We think we're better off concentrating on producing the best control panels and wires. That's our business. No baiting offers. We are interested in your present needs. Not five years from now. Our new products people will help you meet *those* needs. And you can be sure of the same MAC Panel quality, service and value. Probably better. Why? Because we're tab men and we'll gain experience with you. When it comes to meeting problems we'll be there. And, as in the past, probably the first to produce the products that solve them. Our efforts aren't divided among many products. We're giving the panels all we've got. We've made it our business to know data processing. Our time and effort is devoted to producing and selling products that will give you the kind of service you can rely on. What's that saying about building a better mousetrap?

MAC PANEL

Division of Adams-Millis Corporation

MAC PANEL COMPANY, High Point, North Carolina

BUSINESS AUTOMATION

July, 1961
Vol. 6, No. 1

Reporting and interpreting for management on ideas, developments, applications, results and impact of business automation in commerce, industry and government.

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Scanning the Issue

WHEN he warns: **"Don't Bet on Business Games,"** Bill Christian is offering some mighty sound advice, backed up by dozens of interviews with leading authorities in the field. You'll enjoy this frank, revealing article about management games; and even if you don't agree with his point of view, you'll learn many enlightening — and perhaps, stimulating — facts about games, the men who created them and the men who play them. Page 22

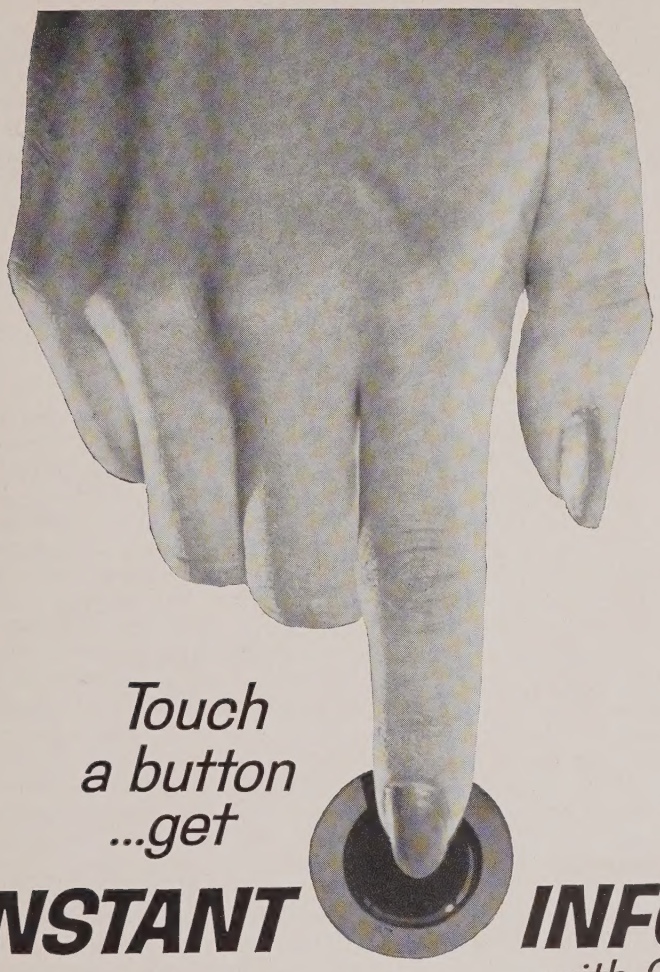
Newcomers are continually appearing on the scene in the fast-growing, fast-changing computer industry. You'll get a chance to meet them in a vital new series of articles being introduced this month. Our first subject, Minneapolis Honeywell, was already famous as the first and foremost manufacturer of automatic controls when it decided to enter the computer field in 1955. Now, the widespread use and acceptance of Honeywell's 800 and 400 EDP systems—new names in a new industry—offer plenty of proof that **"In the Computer Industry, All's Well with Honeywell."** Page 26

A microwave radio system that bridges the Continental Divide . . . a national network of Teletype communications . . . the world's fastest facsimile equipment . . . and a large-scale electronic computer . . . all of these have been combined by the Denver and Rio Grande Western Railroad to provide pinpoint control of freight car movements. The exciting story—told for the first time in any magazine—appears in this issue under the title: **"The Railroad That Takes to the Air."** Page 32

One of the nation's largest steel producers, Youngstown Sheet & Tube Co., controls plant, office and warehouse with punched cards—81 of them in all. In **"Warehouse of Cards,"** you'll learn how these cards are used to maintain a stock of 8,000 different varieties of tin-plate, used to manufacture every type of product from railroad spikes to automobile bodies, with near-perfect inventory and production control. Page 38

This month's cover

This is a laboratory scene without test tubes, atomic tables or white smocks—a typical management game called "The IBM Management Decision-Making Laboratory." Officials of the Mellon National Bank & Trust Co., Pittsburgh, are using it to test their skills against hypothetical corporations.



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BRAND

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at the enlarged microfilmed information on the bright viewing screen of the THERMO-FAX "Filmac" Reader-Printer. Touch a button and...

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RANDOM ACCESS

Information bits from the Editor's memory file

Computer Can Pick Your "Bad" Days

The Swiss have taken a theory of biological rhythm, dating back to 1905, adapted it to a "pocket size" computer, and along with a series of charts that can be interpreted on the basis of one's birth date, claim that they can predict a person's "critical" days for a given year. The theory of biological rhythm dates back to 1905 and is attributed to the late Dr. William Fliess of Germany. Dr. Fliess held that each human being is born with three different cycles: (1) a 23-day rhythm of physical strength, endurance, resistance, and confidence; (2) a 28-day cycle governing sensibility, nerves, intuition, moodiness, and creative ability; (3) a 33-day cycle of intelligence, memory, mental alertness, reaction, and agility. Interaction of these curves is supposed to identify a person's high and low, or good and bad times.

According to George Carroll, aviation editor of the New York *Journal-American*, the Swiss system is getting scientific consideration from both the Federal Aviation Agency and the U. S. Navy, as a possible means of foretelling when pilots are more prone to accidents, thus making it possible to keep them out of the cockpit on those dates.

The Swiss development is represented in this country by George Thommen, a Swiss-born importer. Thommen claims that 65 percent of 15 Navy plane accidents recently analyzed were shown to have occurred on critical days.

The Ump Is Out

Mr. Lloyd F. Knight, a Long Island engineer has obtained a patent which may eventually furnish the baseball umpire with an electronic eye. The proposed system includes three television cameras, one at each side of the batter and the third zooming in from an overhead position.

The side camera will show the ball's height, and the top camera will indicate if the ball is over the plate. The chief umpire could monitor the game and recall the path of the ball from a tape record in case of a dispute. Cameras would also be used to record decisions on the bases. Knight visualizes the umpire removing himself from behind the catcher and running the game from the stands—where, as any fan knows, you can see the play better anyway.

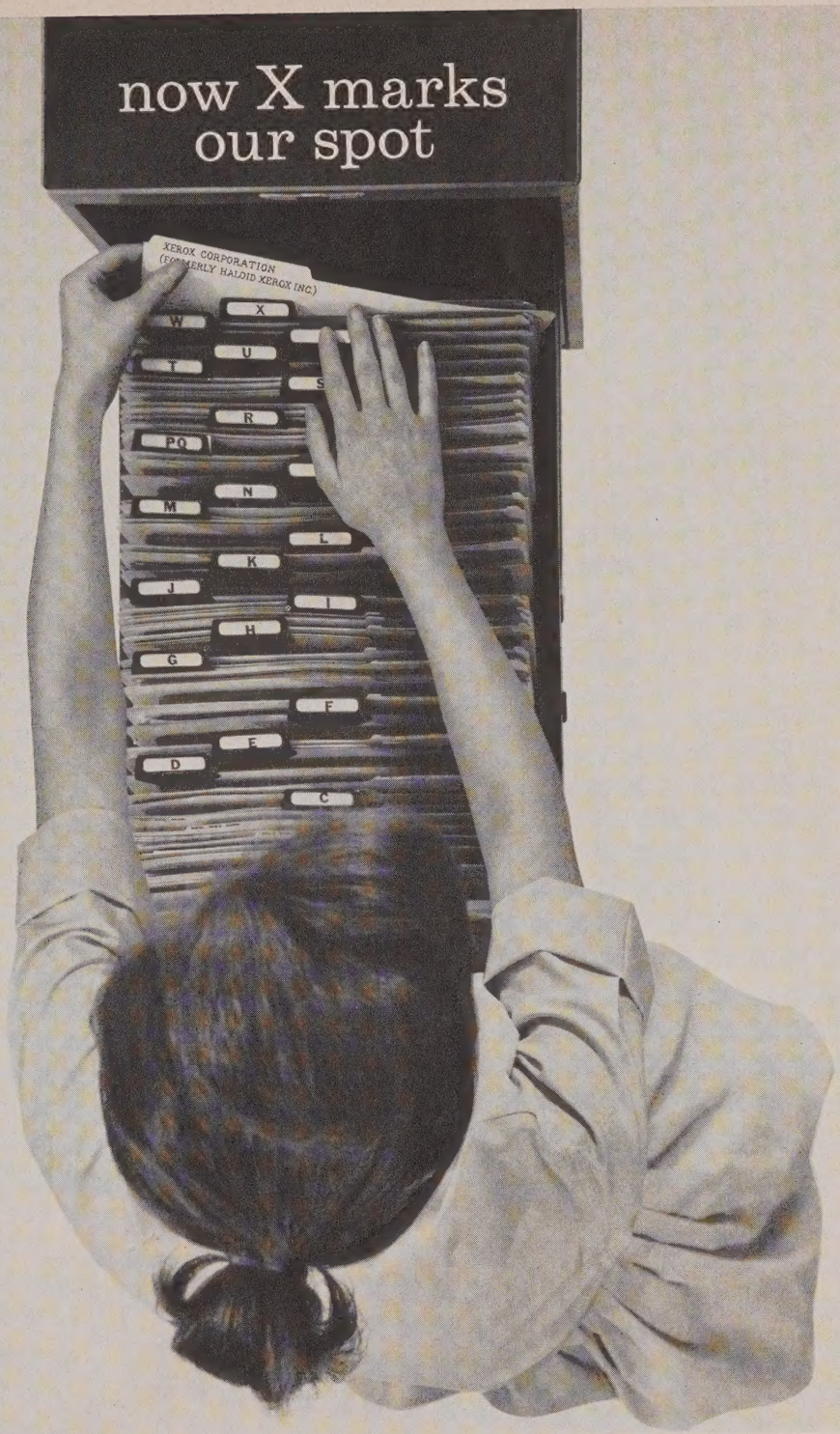
Holey Cow!

The Dairy Records Processing Center at State College, Raleigh, N. C., uses punched cards and a computer to provide dairy farmers and research workers with a wealth of valuable information.

Records are kept on over 105,000 cows monthly, with about 4,000 cows added each month.

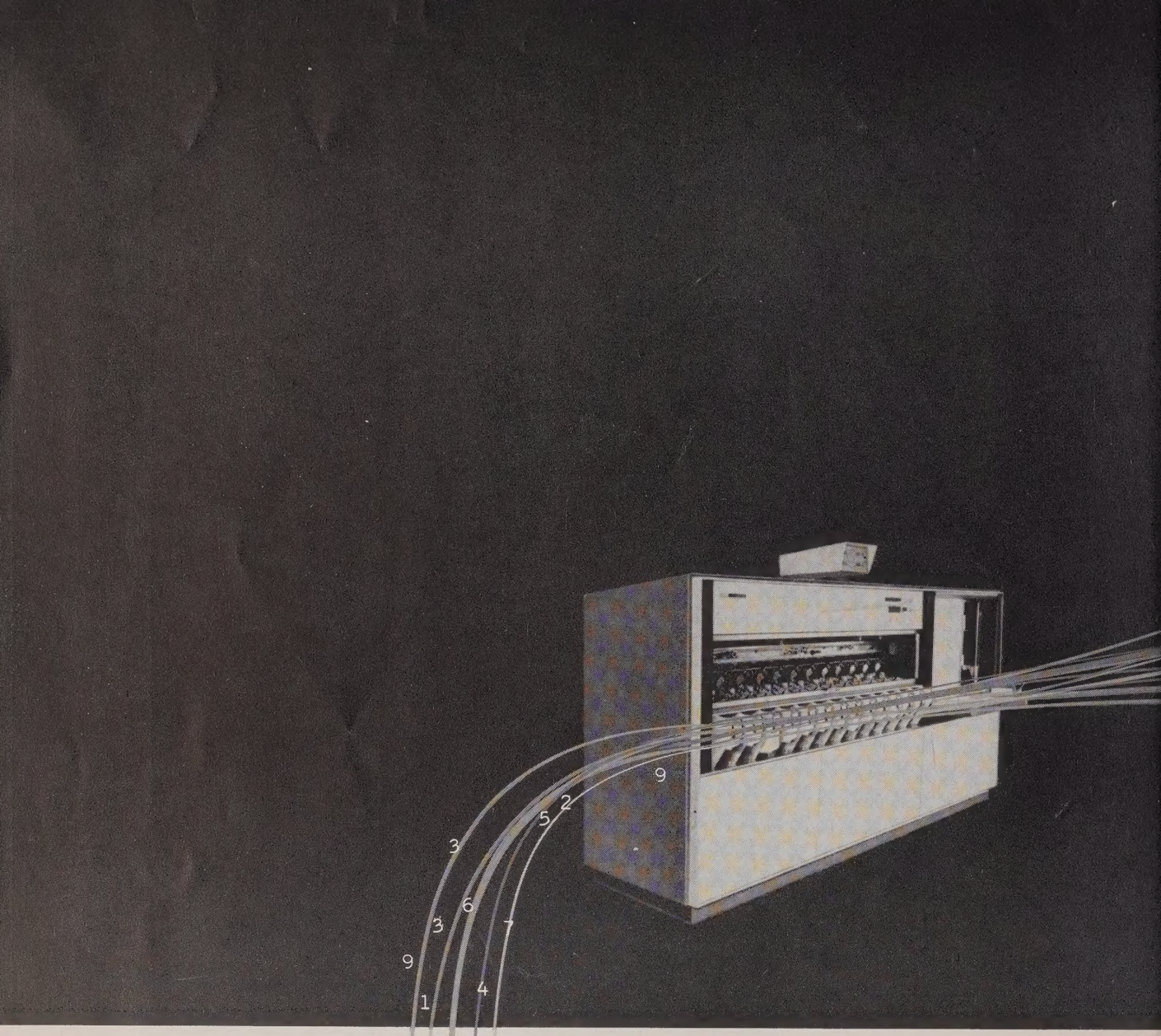
Dairymen pay 10 cents per cow for the service. State College furnishes the facility in exchange for research and educational information obtained from the records. Farmers from every southern state furnish records to the center.

now X marks our spot



XEROX
CORPORATION

On June 1 the name of our company changed from Haloid Xerox Inc. to XEROX CORPORATION. Therefore, you will want to bring **your** reference files up-to-date. Then, when you're looking for information on office copiers, high-speed continuous printers and other reproduction equipment, you will find it—under "X." ■ Why this curious name "Xerox"? The word is of classic origin and stems from the Greek **xeros,** meaning "dry." And **dry** describes, perhaps as well as one word can, the revolutionary process on which our copiers and printers operate. ■ The initial "X" in all English words of ancient Greek origin is pronounced as a "Z." Hence, Xerox is pronounced **zerox** . . . but here we part company with all things ancient and Greek! ■ For the Xerox in our new corporate name stands for a modern, progressive, research-oriented company which, through exciting new products, is making its mark in the growing field of graphic communications. ■ In meeting the needs of modern business for better ways to record, condense, store, and recall the sheer mass of information, XEROX CORPORATION helps management to manage the future. For more information on our company, write XEROX CORPORATION, 20 Haloid Street, Rochester 3, New York.

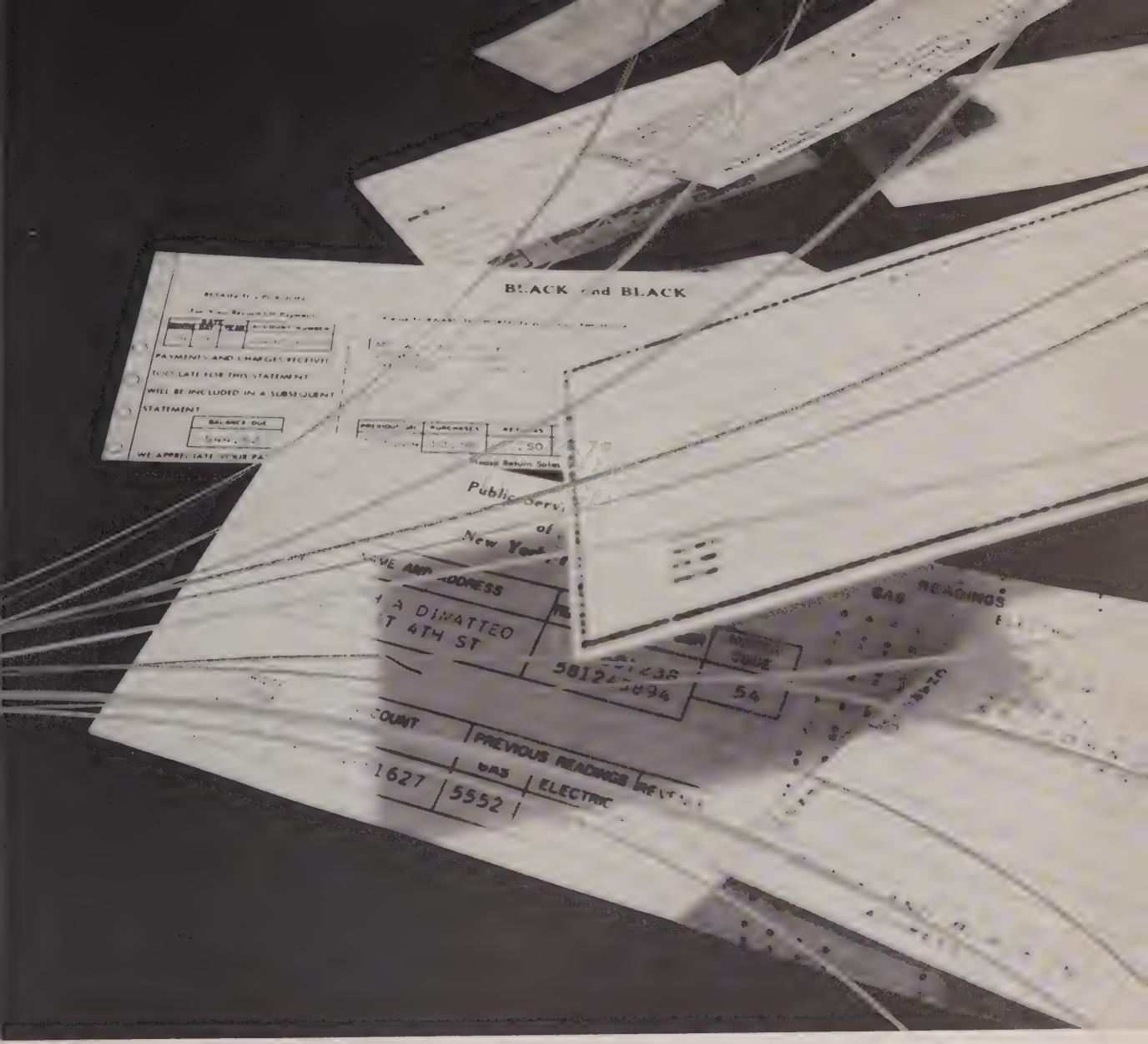


IBM 1401
DATA PROCESSING
SYSTEM

IBM® 1418 Optical
reads printed

Direct input to a computer *without manual keypunching*—that's how the 1418 dramatically boosts input speeds, and raises over-all efficiency.

Typical example: in a job that normally would call for 20,000 punched cards, the 1418 reduces 200 hours of keypunching and verifying to *one hour* of "reading." The 1418 reads numerical data and marks on bills, invoices, checks and other papers at speeds up to 480 characters a second... and up to 400 documents a minute.



Character Reader
numbers directly into the 1401 system

Reading is *optical*—no special inks required. Documents prepared on 407 accounting machines, 1403 printers, typewriters equipped with IBM 407 type, or credit imprinters with elongated 407 type, are the "reading matter" for the 1418. Since your 1401 computer controls the feeding of documents into the 1418 reader, you can get either continuous or interrupted feeding for special processing.

Depending on your needs, there are two 1418 models to select from. One has three stacking hoppers. For more complex sorting jobs, there's another with thirteen which sorts documents either under 1401 control, or independently.

Optional features include: a second optical reading station which permits two lines to be read on a single pass; a mark reading station for reading pen or pencil marks optically.

For more facts about how the 1418 increases the through-put of your 1401 System, call your IBM Representative.

IBM®
DATA PROCESSING

from the Publisher's Desk

IN THE fast-paced field of business automation, it would be a simple matter to edit a magazine with the old "scissors and paste-pot" technique, using only the wealth of news releases and "canned" features that reach us each week. Or, to rely on the contributions of people in the industry who know their own professions well, but whose writing qualifications are little above the amateur status.

Our editors don't subscribe to this kind of policy. They prefer to develop their own material from first-hand interviews and observations. This issue is a good case in point.

Bill Christian's lead feature on management games, for example, is based on interviews with many knowledgeable people in the industry.

The Denver, Rio Grande story on page 32 is the result of over a year of investigation and planning by Editor Arnold Keller. Final investigations were made personally at the railroad's headquarters in Denver. As a consequence, these facts are available exclusively to BUSINESS AUTOMATION readers at this time. Other publications will receive the official news release from the Denver and Rio Grande about the same time that you are reading the article.

The Honeywell story, first in a series on the newer entries to the computer field, also was researched in depth by our globe-hopping chief editor. Interviews in Boston and New York over a period of many months brought this exclusive feature into being.

Don Young's intriguing report on information retrieval is the result of on-the-spot investigations at Western Reserve University in Cleveland.

And so it goes in other issues as well. Our editors spare little to provide a continuous flow of authoritative, timely and professional material to interest, stimulate and, we hope, expand each reader's vista of the broadening subject of business automation.

Charles W. Gilbert

BUSINESS AUTOMATION

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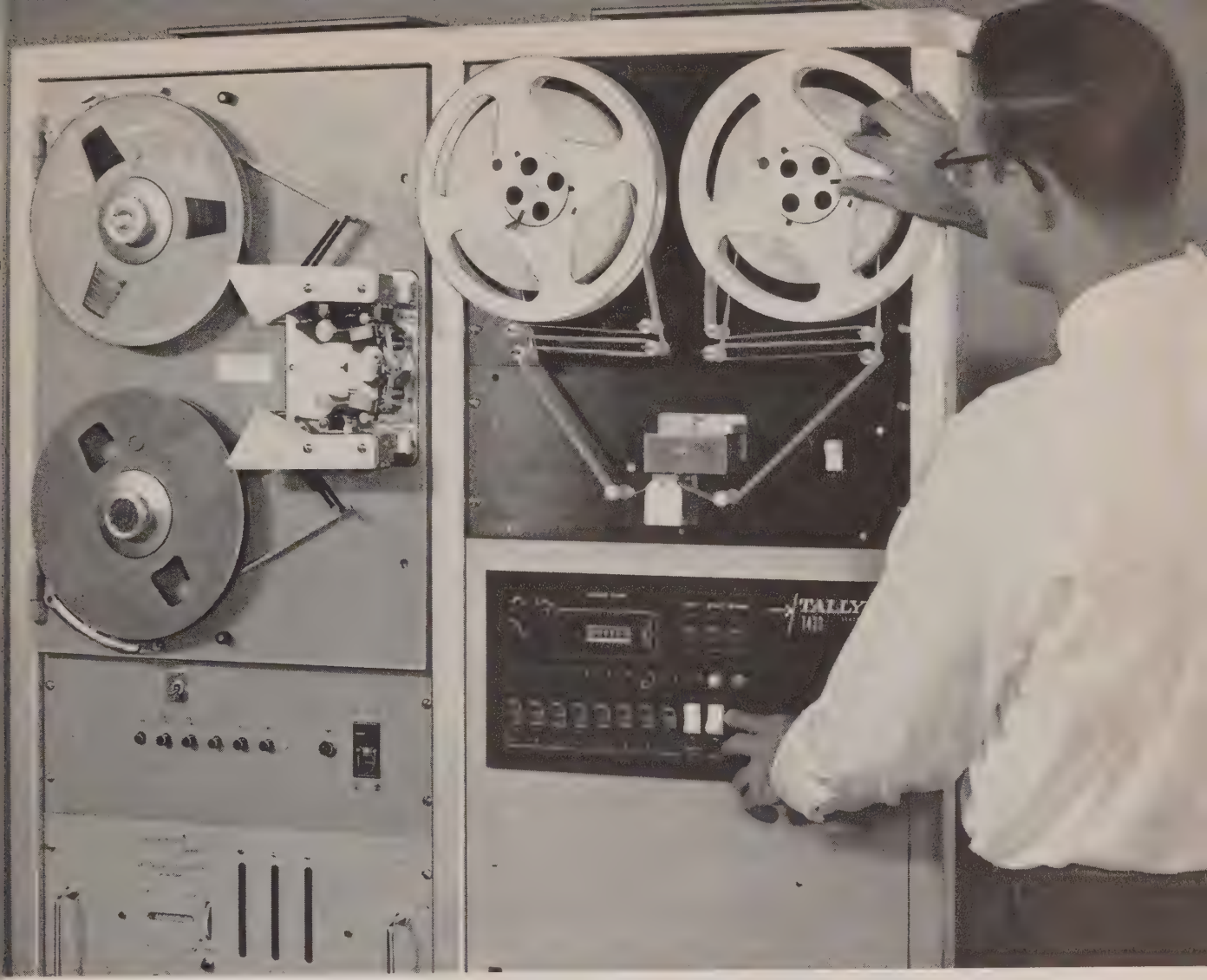

How to convert perforated to magnetic tape at a reasonable cost (NOW)

Tally's new solid state Model 1433 Paper-to-Magnetic Tape Converter is not 10 years ahead of its time. You can solve today's media conversion problems with both integrity and economy.

Normally, input and output data are completely identical in content. The output record is a bit for bit image of input data. A universal code conversion feature is, however, available.

Without changes or adjustments, the Tally converter will accept paper, foil, or plastic tapes in widths varying from 5 through 8 levels. It writes data on magnetic tape compatible with IBM 727, 729 Mod 1, and Remington Rand computer formats. Other formats are also available.

SEE US AT WESCON—BOOTH 2516

Complete in itself, the system includes a 120 cps paper tape reader, a Potter magnetic tape handler, and necessary electronics. Price of the Model 1433 begins at $26,500. Delivery is currently 120 days. More information can be obtained from your Tally engineering representative or by writing

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REGISTER CORPORATION
1310 Mercer Street • Seattle, Washington
MAin 4-0760
OFFICES IN ALL MAJOR CITIES

For More Information Circle Reader Service Card No. 190

Letters

Dear Sir:

Many thanks for the fine article on General Development Corporation's Univac installation in April issue of Management and BUSINESS AUTOMATION. We are very happy with the way things turned out.

Donald F. Louser
Coordinator of Data Processing
General Development Corp.

Dear Sir:

Mr. Marion Harper's article, "Business Needs an Intelligence Director," in your March issue, offers hope that managers may catch up with the capability of automated office equipment.

Your "Blue Sky" men in the laboratories are always well ahead of businessmen. There is no danger that the gap will be closed soon or ever, but businessmen should be about trying to close it. Mr. Harper's idea for an "Intelligence Director" surely will shed needed light for managers in the darkness caused by rapid scientific innovation.

J. H. Euston
Vice President
Business Research Corp.

Dear Sir:

Will you please grant me permission to reprint the article, "Automation—The Job Maker."

As we have placed our order for an electronic data processing system, we feel that this article would be timely reading, especially for the employes most directly affected.

Incidentally, may I take this opportunity to thank you for such a good job on "Who's Hoos." You may recall that Hoo's article in the Harvard Business Review received a lot of unfair publicity. Subsequently your editorial in the Sept. 1960 issue expressed so closely my own opinions that I circulated that issue of BUSINESS AUTOMATION to our top people to help correct the negatives from her article.

W. F. Hayes
Assistant Controller
Northern Illinois Gas Co.

YOU CAN SPREAD A COMPUTER ALL OVER THE MAP!

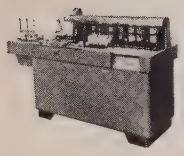
NOW . . . the general accounting, record keeping, and all data processing of your branch offices can be integrated into a single efficient system. No more time will be lost through present slow means of communication! A Philco 2000 Computer at your home office, with a Philco Data Link system using Philco Microwave or Leased lines, will instantly handle all of the data being fed from each of your branch locations . . . "instant processing." There can be as many links as you have sources. The new Philco Data Link system is your key to a more efficient operation. Let us tell you more about it. Write today for detailed information.

PHILCO

Famous for Quality the World Over ®

PHILCO CORPORATION • GOVERNMENT & INDUSTRIAL GROUP • COMPUTER DIVISION, 3900 WELSH ROAD, WILLOW GROVE, PA.

The Sucker Cup! an innovation in **punch card billing**



This is the business end of a sucker cup, part of the PCB unit in a Phillipsburg Inserter that now provides for the mailing of punch card bills—*automatically!* Varying numbers of sales slips and the accompanying statements are gripped firmly by the sucker cup, turned over to reveal the address and inserted into a window envelope. Additional pieces may also include advertising matter. The envelope is then moistened, closed, sealed, postal or other indicia imprinted, counted, stacked...the complete job ready for the post office. All the advantages of accuracy, speed and economy of punch card accounting brought right into the mail room with a Phillipsburg Inserter.

Write for complete information on the mailing advantages and conveniences of a Phillipsburg Inserter.

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5. **The Consolidated Functions Approach.** An insurance company's program for total automation.
6. **Business Office Sets Fast Pace for 'Space-Age' Hospital.** How a modern hospital has capitalized on business automation to operate its business side.
7. **The Office Manager—An Automation Casualty.** A critical analysis of the office manager's failure to meet the challenge of automation.
8. **A New Role for the Systems Man.** John Haslett, Manager of Methods and Procedures for the Shell Oil Co., analyzes the past, present, and future of the systems man.

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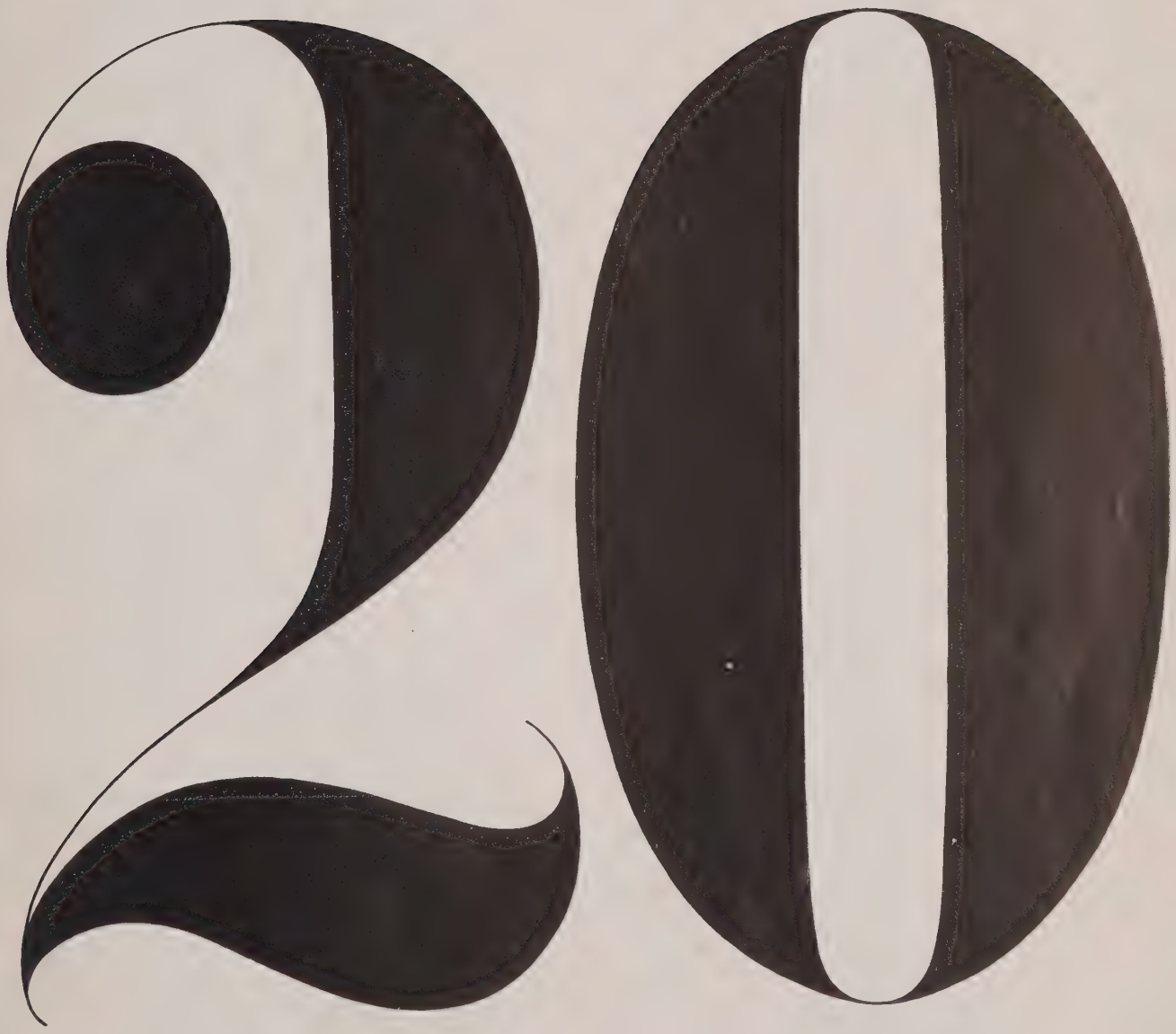
16. **Carte Blanche—the Automated Credit Card.** The Automation story behind the new giant of the credit card world—Hilton's Carte Blanche.
17. **Magnetic Ink Goes to Work.** The story of a bold leap from non automation to a new concept in data processing systems, using magnetic ink character recognition. (Case history of the Merchandise National Bank's installation.)
18. **Magnetic Tape Pays A.T.&T. Dividends.** One of the largest conversions to business automation ever undertaken by private enterprise—the records of American Telephone and Telegraph Co.'s 1,600,000 shareholders—described in depth.
19. **Major Breakthrough in Paper Processing.** The story of MICR (Magnetic Ink Character Recognition)—how it developed, its impact on the banking field, and a review of some of the equipment available.
20. **A Complete Automation System Delivers the Goods.** How a complete automation system enabled the Yale Transport Co. to reduce the time of delivery from two to three days service (and longer) provided by most carriers, to an overnight service.
21. **Automating Is a Job for Top Management.** The story of Carborundum's "total systems" concept by General Clinton F. Robinson, president of the Carborundum Co.
22. **Westinghouse Automates Engineering Drawings.** A complete description of Westinghouse's use of microfilm in punched aperture cards for the filing and reproducing of engineering drawings.
23. **Automation Pays a Million Dividends.** How automatic disbursement of stock dividend checks to over 1,600,000 stockholders of 185 corporations is saving time—and money—for the Stock Transfer department of the Chase Manhattan Bank in New York.



FROM UNIVAC®

AUGUST 1960—Univac® Larc I, world's most powerful computing system, passes acceptance test

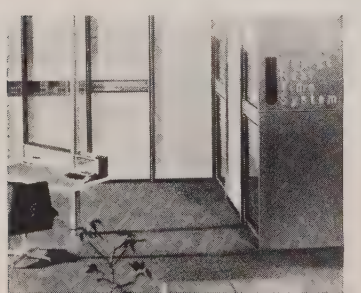
Univac Larc I has been operating since August 1960 at the Atomic Energy Commission's Lawrence Radiation Laboratory at the University of California. Only one other accepted computer in the Free World compares to Univac Larc I in size, speed, and power. The other computer: Univac Larc II—installed and now delivering results for the U.S. Navy, Bureau of Ships, David Taylor Model Basin. Univac Larc I and II are achievements which are equal in importance to the invention of the world's first electronic computer. All three, achievements of Univac.

DECEMBER 1960—Univac announces major breakthrough—new Univac 490 Real-Time System

Distance and time gap no longer limit the effectiveness of data communications. For now Univac 490 Real-Time System takes questions from hundreds of remote points, updates master records, and transmits answers in a matter of seconds.

For example, data fed to the central system over a communications network from distant, far-flung sales points can be used simultaneously to reduce your inventory, explode cost factors, and even alter production schedules when necessary. Or, in the case of an airline reservation system, the transmitted data could be constantly updating the system's seat inventory or passenger records.

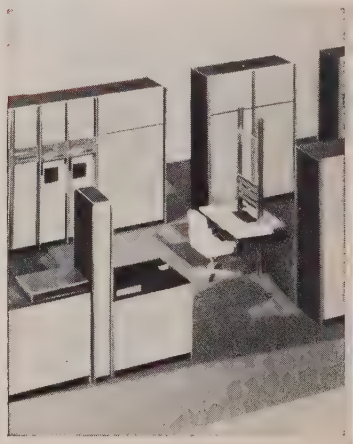
The new Univac 490 Real-Time System processes all data, corrects its files, and answers the problems of each location as if it were in the adjoining room.



DECEMBER 1960—World's first commercial thin-film memory computer introduced by Univac

Univac Division scientists have introduced ferromagnetic film which is the fastest and most advanced computer memory ever developed.

Coupled with this major advance came the first commercial computer of its type in the world, Univac 1107 Thin-Film Memory Computer. This powerful system provides fantastically fast access to stored information. Previous computers measured access time in millionths of a second. Now with Univac Thin-Film it is rated in nanoseconds—billionths of a second!



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MAY 1960—Univac introduces a high-performance, low-cost data processing system: Univac III

Univac III offers large-scale performance at lower cost per unit of output than any other system in the market.

Developed by the men who invented the world's first electronic computer, Univac III incorporates the most advanced solid-state circuitry and data processing concepts. For example: because of a new character packing technique, information which previously required 20 reels of magnetic tape can be stored on only one reel of Univac III tape and read off at the rate of 200,000 digits every second.

No other commercial computer combines such great application flexibility, high-computing speeds and accurate performance in a single system!

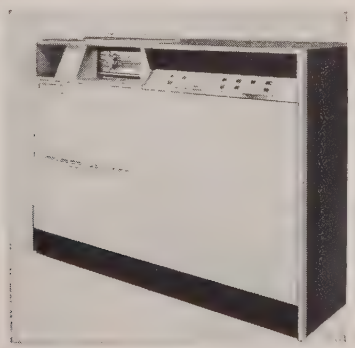
6

MARCH 1960—New Compatible High-Speed Printer provides complete systems compatibility

From Univac, another giant step forward: the new Univac Compatible High-Speed Printer. Users of competitive equipment are no longer bound to one manufacturer.

Model I of the new Univac High-Speed Printer operates off-line with Univac systems. Model II operates off-line with computer systems of another leading manufacturer.

Both models have been thoroughly field tested and are already in use delivering dollar-saving advantages never before possible.



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AUGUST 1960—Univac announces STEP—a computer plan that keeps pace with your growing needs

STEP—a solid-state system designed to take a business across the crucial step from mechanized tabulating into electronic data processing—was announced to Business-America by Univac in August 1960.

Univac STEP (Simple Transition to Electronic Processing) is economical, versatile, and can be installed without disturbing normal work. Yet there is nothing unsophisticated about it. Built around four units—a Central Processor, a High-Speed Reader, High-Speed Printer, and a Punch Unit—STEP can perform many varied record-keeping jobs. Examples are payroll, sales analyses, and production scheduling. And STEP'S building-block concept permits the addition of equipment options to meet increased data-processing needs.

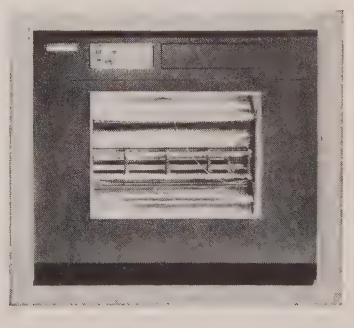
7

OCTOBER 1960—Univac scores again with development of Randex super-capacity storage system

Randex, the new Univac super-capacity drum system, stores over 24 million easily accessible characters per unit. And up to 10 units can be utilized for a total of a quarter billion usable storage positions.

Another big plus for Univac Randex is its remarkably fast access time—as low as 35 milliseconds to read or write 48 10-digit words and signs.

Designed for both Univac Solid-State and STEP Plan Computers, Randex accelerates and simplifies the processing of a wide variety of applications and gives users an extreme degree of versatility and flexibility.



Don't Bet On Business Games

"No game yet developed includes all the problems that management faces: personnel, psychological or organizational." Cohen and Rhenman

By William Christian

CURRENT fad of the business world is the management game. At conferences and seminars, thousands of executives willingly are herded together at computer centers; divided into competitive teams; ushered into small, smoke-filled rooms equipped with a blackboard and calculating machine; and instructed to spend huge sums of hypothetical money belonging to non-existent enterprises, while a computer keeps score of their executive ability.

What does management expect to gain from this expenditure of valuable time? Presumably, games are a revolutionary new training device. Some businessmen expect to learn how to predict the outcome of their decisions. Others hope to find out more about computer ability and scientific management techniques.

It is highly questionable that the games completely fulfill these expectations. Some executives complain that the games are nothing but bait used to lure unsuspecting players into an all-day computer commercial. Others protest that the games are too unrealistic and that they don't have enough time to make decisions for games to be beneficial to them. Most, however, agree that games are great fun to play.

The idea for business games was derived from war games originated by the military to test new strategies in times when no actual battles were being fought. First, and probably best known, of all business games is the American Management Assn. Top Management Decision Simulation, devised in 1956. Publicized as a training device for upper echelon management, it is primarily a business war game in which teams of players, in direct competition with each other, make the basic decisions typically faced by top management—and see the results immediately.

The "gamesmakers"

The game is simple enough to describe and is fairly typical of most management games in approach. In the AMA game, five teams (companies) of three to four players each are assumed to be manufacturing the same product, starting at the same financial position and given the same decisions to make at representative quarterly intervals. A computer calculates the results of each company's decisions as they are made. Returned in the form of quarterly operating reports, these results become the team's basis for making succeeding decisions, and the object is to see which team can improve its financial position the greatest amount over a 10 to 40-quarter period. Games may or may not be played on a computer; mathematics, not the method, is the important thing.

Games fall into two types: general management games, just described; and functional games designed to cover one operation of a company, such as inventory control or production.

What motivated the actual construction of games, particularly the AMA game, is extremely vague, upon study. The pioneer group, which drew

"Even the most complex game models are absurdly simple in comparison with the real world of business."

Kossack

"Other than the mere number of games developed or in use, (their) success is unproved and, in fact, highly suspect."

Steele

its inspiration from war games, was headed by Franc M. Ricciardi of the AMA; Richard Bellman, The Rand Corp.; Charles E. Clark and Donald G. Malcolm, Booz, Allen & Hamilton; and Clifford J. Craft, AMA. In a technical paper jointly authored by this group, they define their approach as one based on the construction of a mathematical model which tests statistics and procedures with variable data to produce a result in accordance with actual observation.

They point out: "It is clear that business games have a reasonable chance of being applied immediately to company planning and executive training."[1] In other words, what they hoped to achieve was real scientific management.

Besides training, their more realistic goal was the technique known as simulation. To "simulate" a specific company, as is practiced today, every known statistic and function pertaining to that particular business is used to create a series of mathematical equations (or a model) which represents the trends of that company's activity. To test a management decision on the company, the decision is mathematically equated, entered as a variable in the model, computed and the most likely outcome is given as the answer.

This is where business games and serious scientific management meet the parting of the ways. The AMA "gamesmakers" succeeded only in creating an apparently realistic model—which was no small feat in itself—but it could only be considered a good general model or part of a pilot study at most. This model was not sophisticated enough to be truly representative of a number of businesses, and it could not serve as a "master model" for general business use. It was a good experiment, however, and it did prove the feasibility of the simulation technique. It was easy enough for the AMA and the originators of the basic model to utilize it as a game and call it a "training device."

Consultants, educators and computer manufacturers were quick to realize that executives who had enjoyed playing the AMA game were giving a good deal of favorable attention to the idea. As a result, some 100 management and functional games have been devised over the past four or five years. In the fervor, games threaten to become meaningless ends in themselves.

A tender trap

While the "gamesters" have been dreaming up new kinds of playthings, exponents of scientific management have taken a practical, serious-minded and successful approach to the technique that motivated games existence — simulation. Major computer manufacturers and consultants have helped progressive businessmen take advantage of simulating reality within their own companies. Operations research specialists, facilities and computer time have been turned over to the project and simulation has been entered into on

[1] *Bellman, R., Clark, C. E., Malcom, D. G., Craft, C. J., Ricciardi, F. M., "On the Construction of a Multi-Stage, Multi-Person Business Game," Operations Research, Vol. 5, No. 4, August, 1957.*

a private and earnest basis. The result is that simulation is a legitimate scientific management technique with practical feasibility, and the people who use it have a decisive advantage over other companies in the same industry.

Unfortunately, the art of applying science to business has met with much reluctance, suspicion and even fear from many business administrators who do not understand the techniques. In an effort to explain and simplify the technique, computer manufacturers, management consultants, professional management organizations and teachers of business administration have enlisted each others' services to devise a tender trap with which to lure unsuspecting management. With business games as a catalyst, these matchmakers hope to unite science and business so that they may face the world of increasing complexity and competition together.

Used in this manner, business games are a legitimate technique in familiarizing management with a specific method, if the players are aware and receptive to the reasons for which they are playing the game.

Except to illustrate computer abilities or as an introduction to simulation, games then are of little value. Some of the leaders who are working with games in various capacities vary quite broadly in their views on the philosophy of games.

$10 a point

" 'Monopoly' is a business game, and for that matter may be as good as any," says Donald H. Schiller, partner, Caywood-Schiller, Associates. His firm is actively engaged in operations research for industry and the military (see BUSINESS AUTOMATION, Feb. 1961, p. 16). Schiller points out that a player can often discover the mathematical laws underlying the economics in a business game. "The enlightened player then has little trouble in maximizing his returns. However, the true characteristics of the business world are not easily discovered. They may not even be the same tomorrow as they are today."

Schiller's firm makes use of the operations research tools of war gaming and simulation. "But," as he says, "these games and simulations do not attempt to evaluate the performances of humans; rather they evaluate the over-all performances of a number of interacting machines or weapons systems. In fact, the 'human element' is eliminated from the model as much as possible."

Concerning the training value of games, Schiller said, "Management games sometimes have shown that students are better than executives at making business decisions. Paradoxical results such as this arise from the differences in playing a management game and actually managing a business." He compares one of these differences to the way you would play bridge at one-tenth of a cent a point and the way you would play it at $10 a point. "When the stakes of a game are more than you can afford to lose, you tend to play much differently than if the stakes are small or non-existent."

Edge on the laggards

John W. Pocock, chief executive, Booz Allen Applied Research, Inc., said at a recent interview that business and war games are training and analysis devices used to produce a synthetic situation similar to one normally obtained from real life, but to do so immediately by collapsing the time span between decision and result.

"Business has real experience to draw from and does not require as much synthesized data as war games do," Pocock admits. "People in production control, for example, don't have to play games; they are trained by last month's experience. They can set up models, but they are not playing games; they are playing with a real plant."

Pocock feels that games generally are of most benefit to management levels one or two echelons below the president. "Through them," he says, "lower-level management often begins to sense the interdependence of their functions."

In explaining the use of simulation as a scientific management technique, Pocock says that we know that business operation is constructed on some sort of pattern—even though we don't know exactly what it is. We have to discover the pattern through research and analysis using statistical, mathematical and other tools. Operations research develops models from the ordering of these patterns of apparent "randomness." Development of games can be a prelude to a complete simulation.

Why does management have to be cajoled into availing itself of scientific management techniques illustrated by management games, Pocock was asked. "Because management very well may have been oversold by a lot of poor simulation work, done incompletely," he replied. "This has given simulation a bad name in some instances. All sorts of companies can use simulation and models can be developed, especially if their business involves lots of statistics and a very great frequency of events."

Early to recognize the practical, long term possibilities of business games in teaching and problem solving were management consultants such as McKinsey & Co., Inc. A member of their

firm, Winston C. Dalleck (see BUSINESS AUTOMATION, May 1961, p. 14), together with Robert B. Fetter, associate professor of industrial administration, Yale Univ., has constructed an inventory simulator, which is used as a functional game.[2]

Dalleck expresses a positive attitude toward games when he says: "Games should help management (1) to understand the processes of decision making, (2) to 'break the ice' for operations research work and (3) to demonstrate the practical aspects of scientific management. Games can help to make management comfortable and take the threat and mystery out of OR."

To this end, Dalleck describes the real value of gaming (exclusive of demonstrating computers) as a way in which to show management how decisions are interrelated and how decision-making might be improved. Once that has been proven, management can take a deeper look into the practical usefulness of games, and eventually enter into simulation.

McKinsey also has developed a popular bank management game written by W. H. Dennick and F. X. Olanie, Jr., in conjunction with IBM and several banks.

Authors of the bank management game, Dennick and Olanie trace the evolution from early accounting operations to simulation: "Historically, in companies that acquire computers, the first big step after setting up routine paper work and payroll systems is to see what use can be made of the machine in developing and analyzing key bits of management information. This same sequence likely will be followed in banks. A few are already studying possibilities of simulation for various phases of their operation; and those banks that develop experience in this field will have a competitive edge on the laggards." They strongly feel, also, that some special characteristics of the banking industry—and of the McKinsey banking game—make it entirely feasible to build realistic models of actual bank functions.

Interest-getters

Another group bearing vested interests in business games is the computer manufacturer. International Business Machine Corp. started the ball rolling by computerizing the AMA's management game. IBM also programmed a variation of the AMA game for its own use, fully realizing that computers, used to project business game decisions, would and did impress top-level management and stimulate interest in sales.

[2] *Dalleck, W. C. and Fetter, R. B., "Decision Models for Inventory Management," Richard D. Irwin, Inc., Homewood, Ill., 1961.*

Robert DeSio, regional manager of systems engineering in IBM's Midwestern Div., says: "Management games won't teach businessmen to be better managers, but they can give management an awareness of what gaming techniques can do for them. They can realize that simulation on a computer can compress time and measure decisions made under a controlled environment."

From a commercial point of view, DeSio does not deny that games make managers aware of the computer's possibilities. To him, games function (1) as interest-getters, showing new computer dimensions, and (2) to make management aware of the variables in training general managers.

"They demonstrate the potentialities of the computer in management sciences," he says.

Freely and easily

Radio Corporation of America recently exploited its own work in forecasting to create a business game which will interest management in its computers. Elizabeth L. Gardner, Chicago Sales Office scientific methods manager for RCA, designed the company's management sales forecasting game, which is an outgrowth of the same forecasting model that RCA used for forecasting the results of the 1960 Presidential election and in predicting their national television sales within a margin of two percent. (BUSINESS AUTOMATION is running a complete article on RCA's sales forecasting method in the August issue.)

"Our game serves primarily as a demonstration of computer and sales forecasting capabilities," Miss Gardner commented during a recent interview. "It is not intended to be used as a testing or training instrument. However, many managers feel that modern forecasting techniques are some sort of magic. The game makes them easier to explain, puts them in proper perspective, and points out the advantages of their use."

Other points Miss Gardner brought out are that "although games are frequently good sales techniques, most are not very complex in terms of computer operations, and they are quite expensive to play."

From a recent study, Kalman J. Cohen of the Carnegie Institute of Technology and Eric Rhenman of the Stockholm School of Economics have written a paper entitled "The Role of Management Games in Education and Research." In it, they conclude: "Playing business games will not produce a complete manager. No game yet developed includes all of the kinds of problems that

Continued on Page 66

This is the first in a series of penetrating profiles, written by Arnold E. Keller, on American firms that are making a major bid for prominence in the EDP industry.

In the Computer Industry, All's Well with Honeywell

A GROUP of scientists assembled in "Lab 30" in the spring of 1955 and began the task of developing a new concept in business computers.

The laboratory was a small workshop, located in an old bleachery on the Raytheon Co. grounds in Waltham, Mass. The scientists were engineers and mathematicians, men and women who, as early as 1943-44, had pioneered development of electronic computation at Harvard, Massachusetts Institute of Technology and the Aberdeen Proving Grounds in Maryland. Such was the beginning of Minneapolis - Honeywell's Electronic Data Processing Division.

Six years and $65 million are behind Honeywell's bid for supremacy in the field of electronic data processing.

Six years and $65 million later, Honeywell today is an established factor in the nation's thriving computer industry. Over $70 million in EDP systems—the Honeywell 400 and 800—are already installed or on order.

That the Minneapolis-Honeywell Regulator Co. should be successfully invading the electronic data processing business is no surprise to anyone familiar with the background of the 75-year-old company. Controls are Honeywell's business, as their name implies; and they have been since 1885, when, as a one-man organization, Honeywell began to produce the first home heating control system. This device, a bi-metal type thermostat and a spring wound motor, opened and closed the dampers on coal-fired furnaces and marked the beginning of automatic home heating in America.

Honeywell now is the world's largest producer of automatic control equipment. More than half of their 13,000 different products involve electronics, ranging from an electronic "watchdog" system designed to protect buildings against intrusion, theft or vandalism; to extensive systems in the field of missile guidance, aircraft and space vehicle controls, anti-submarine warfare, electronic weapons support systems and a host of other systems and devices for space and national defense. Several of these sophisticated electronic systems controlled the flight of the recent Project Mercury man-in-space capsule.

The firm's guiding philosophy in entering the general purpose computer business was based on two facts: (1) For two decades, electronics had been all-important in the firm's progress; (2) EDP, which uses electronics in an advanced form, was a most natural evolution for the peculiar talents of a large number of Honeywell's 40,000 employes (one in every eight employes is in research or engineering).

After a thorough study, the company concluded that the EDP industry requires a high degree of skill, engineering and manufacturing know-how in the field of electronics, and that it requires not only the ability to design and make the systems, but also an extremely high degree of service, application and educational work. Other conclusions: because of the high original cost of the systems and the fact that they largely are rented, the capital requirements are high; the high capital requirements would preclude very many companies from entering the field; and the profit policies of the largest company in the industry (IBM) indicated that there would be good profits for those who entered the field—and remained.

Overriding even these factors was the Honeywell vision of EDP as an extraordinary revolution in paperwork and scientific aspects of business.

Walter W. Finke, president of Minneapolis-Honeywell's Electronic Data Processing Div.

"It is a field of technological application that could have an impact even greater than atomic energy as far as business is concerned," said Paul B. Wishart, the firm's president. "A field of great growth—a fertile valley for a company that could focus its talent, resources and energies to cultivate its place in the field."

Honeywell's board of directors agreed that EDP was the area of greatest growth potential. Cultivation of the "fertile valley" was soon underway.

In 1955, Minneapolis-Honeywell (with 60 percent ownership) joined the Raytheon Co. in founding Datamatic Corp. to develop and market large electronic processing systems for business. Raytheon already had completed the Raydac computer system for the Navy and was well along in the development of another powerful magnetic tape system for the National Security Agency—a project that later was cancelled by the government as an economy measure.

Datamatic was a happy marriage for Honeywell. It combined commercial marketing know-how with Raytheon's superior knowledge of the computer industry. A majority of the new corporation's 200 employes were engineers and mathematicians who had been brought together by Raytheon to work on the Raydac and NASA projects. They included a brilliant group of scientists who were active on such pioneer systems as Harvard's Mark I, II and III computers; Eniac; Edvac; Ordvac; and other early large-scale systems.

The Honeywell 400 (first installation due in Septembe is in the moderate-price class. The central process (back left) can handle up to 6,000 operations a second.

400 percent better

These scientists, most of whom now are filling key positions with Honeywell's data processing division, are among the leading "old-timers" in the EDP industry. The group includes Dr. J. Ernest Smith, divisional vice president in charge of research and development, formerly director of engineering at Raytheon and holder of numerous patents in radio-relay control systems and modulating and communication systems; Richard M. Bloch, director of product development and former manager of Raytheon's computer department, who was research associate at Harvard's department of engineering sciences applied physics, where he did pioneering work on the original Mark I computer; Dr. Richard Clippinger, technical advisor of automatic programs, headquarters staff; Dr. Ernest J. Dieterich, project director for Honeywell 800, who was head of computer systems and logic at Raytheon and designer of the Raydac control unit; Dr. Roger H. Bender, director of applied programming, former mathematics analyst for Raytheon; and Miss Irma M. Wyman, technical advisor to the director of marketing and former member of the computer services section at Raytheon, who worked on the Mark I computer as well as the design and program logic of MIDAC while at Willow Run Research Center.

Datamatic's first job was to develop a large general purpose computer that was to be marketed as the Datamatic 1000. Before completion of this project, Honeywell (in 1957) bought out Raytheon's interest in Datamatic Corp. and established the company as Honeywell's Datamatic Division. In 1960, the name was changed to the Electronic Data Processing Division, which more closely identified the division and its products.

The first Datamatic 1000 was completed and delivered in 1957 to the offices of Michigan Hospital Service (Blue Cross-Blue Shield) in Detroit. The following year, six more Datamatic 1000's were installed at the First National Bank of Boston (BUSINESS AUTOMATION, Oct. 1958), Baltimore and Ohio Railroad, County of Los Angeles, U. S. Treasury Department, Minneapolis-Honeywell (Minneapolis), and the Honeywell EDP Division in Boston. The latter is being used primarily as a tool in designing more advanced computers and was used extensively in the development of the 800 system.

All of the 1000's are still in use. At Blue Cross-Blue Shield in Michigan, enthusiasm for the system is just as high now as it was when the system was first installed. Robert J. Koch, director-office management division, says: "The dangers of or-

High speed printer (foreground) is part of a Honeywell 800 computer installed in the Wellesley, Mass., Service Bureau.

dering the first piece of equipment from a completely new company in the computer field were recognized and seriously considered. Seeing the Datamatic plant, the scientists and expert technicians who developed the equipment convinced us of their future success. The know-how generated and the confidence which Datamatic displayed were the primary convincing factors. In addition to this, the 1000 looked 400 percent better than any other computer on the market at that time."

Koch added that records of computer performance have been kept since 1958 and the central processor and tape units have a total downtime record of four percent since that date.

Prototype "on site"

Marking the transition from vacuum tube to solid state devices, Honeywell announced specifications for the Honeywell 800 in 1959. This system, with great power, parallel processing ability and numerous economy features, was hailed by the firm as "a true scientific break-through in the art of electronic data processing."

Associated Hospital Service of New York installed the first production model of the Honeywell 800. According to John Koerner, manager of electronic data processing for Associated: "We found that the consolidated functions approach to EDP required a computer system that could process—within one standard shift—hospital admission notices and inquiries twice a day and update more than three million Blue Cross membership files once a day. The 800 could process this critical hospital admission and inquiry run up to 50 percent faster than other available systems—and at a lesser cost."

Koerner, who is president of the Honeywell 800 Users Assn., adds: "The capability of carrying out this run most quickly means that the 800 has available time left over for recovery from downtime, running additional reports, or changes to the routine which could increase running time."

Other 800's have been installed by American Mutual Life Insurance Co.; Army Map Service; Army Finance Service; Metropolitan Life Insurance Co. (first of two systems); Southern California Edison Co.; U. S. Navy Polaris Training Center; Chrysler Corp.; Standard Pressed Steel Co.; and Tennessee Gas Transmission Co. Honeywell's EDP Division has installed one of the systems for demonstration purposes, check-out of customer programs and general service bureau use at its Marketing and Education Center, Wellesley, Mass. An engineering model of the 800 has been in operation at the Division's Engineering and Research Center since last fall.

Among those waiting for installation of 800's are Massachusetts Institute of Technology; Title Insurance Co. of California; University of Southern California; Philadelphia Electric Co.; and

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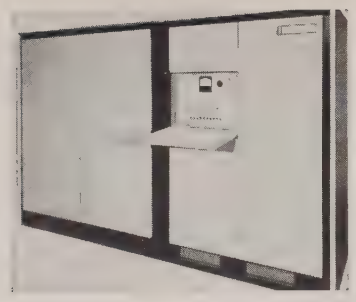
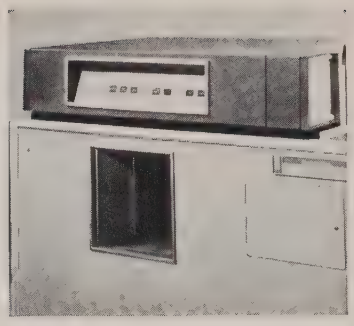


JANUARY 1961—Univac Solid-State and STEP Plan Computers equipped to handle competitive magnetic tape

New Compatible Synchronizers with modified tape units—developed by Univac Division—permit Univac Solid-State and STEP Plan Computers to directly handle competitive magnetic tape systems.

Because of this new development, users of large-scale competitive equipment who are ready to reinforce their installations with satellite systems can now take full advantage of the more versatile internal memory capacity of Univac Solid-State Computers.

This will mean far better performance in satellite system applications, such as short runs, one-time jobs, and special analyses and reports which are not practical to program on large-scale systems.



JANUARY 1961—Short-card feed announced for Univac High-Speed Reader

A new short-card feed option for Univac Solid-State and STEP Plan High-Speed Readers now makes possible computer processing of stub cards.

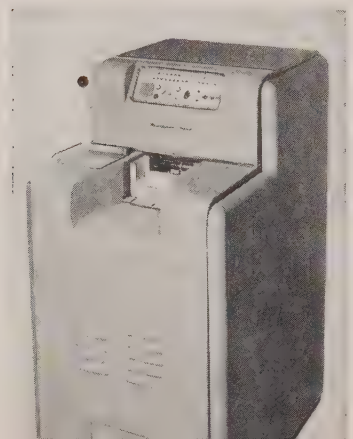
The 90-column reader will accept 16, 27, and 29 as well as full 90-column cards. The 80-column reader will accept 22, 23+, 51 and 66, as well as full 80-column cards.

Switching between card sizes in any given system can be accomplished in a matter of minutes. All you need do is adjust the card transport mechanism to accommodate the desired card size. Short card documents can then be processed at the same fast speeds and with the same high degree of reliability as full-size cards.

SEPTEMBER 1960—Univac introduces another first for 90-column punched-card users: new Univac Optical Scanning Punch

The new Univac Optical Scanning Punch translates ordinary pencil marks into machine language. Any soft black lead pencil may be used and no special symbols are needed. It reads and punches up to 6000 digits per minute—senses and punches up to 40 columns of marking on one side, 80 columns using both sides.

Now, with the Optical Scanning Punch, you can record data at its source and automatically convert it into machine language for faster, more efficient data processing. You can automate your order processing—control the inventory with new speed and accuracy—mechanize your complete accounting operation.

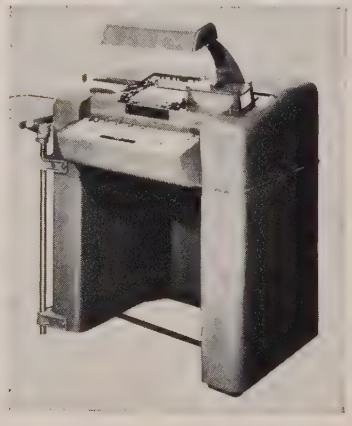


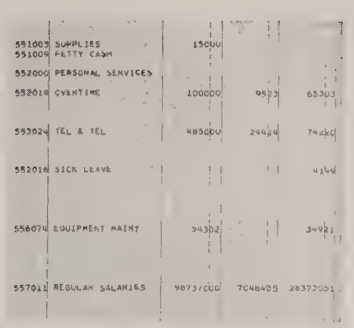
NOVEMBER 1960—Univac develops new Photoelectric Key Verifier

Univac introduces another new development in tabulating equipment—the Photoelectric Key Verifier! It photoelectrically senses errors in punched-card data and segregates error cards.

In one pass, the new Photoelectric Key Verifier can verify either Univac 64-character punching, or standard 90-column, 37-character punching, used by tabulating machines.

With its foolproof method of operation, the new Univac Photoelectric Key Verifier assures the highest quality of input accuracy—a factor vital to data processing efficiency.





JANUARY 1961—New variable line spacing option for Univac Solid-State and STEP Plan high-speed printers

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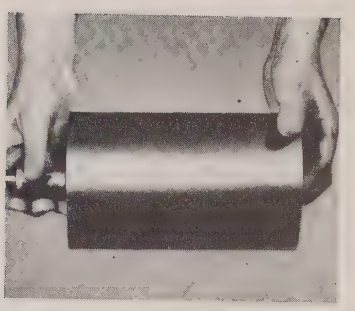
Thanks to this new development, the Univac High-Speed Printer will print eight lines per inch rather than the standard six lines per inch. And by programming the unit to advance two lines at a time instead of one, it will print three lines per inch under six lines per inch control, or four lines per inch under eight lines per inch control.

This is a distinct advantage since the four lines per inch mode is usually required for continuous tabulating card forms and various other documents. What's more, considerable savings in paper and space can be realized.



JANUARY 1961—9200-word drum developed for Univac Solid-State 80/90 central processors

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Data-processing specialists have frequently stated that the most significant factor in determining computer efficiency is the internal memory capacity of the system. Univac Solid-State Computers have always had a large memory and now it's increased still more—9200 ten-digit words plus signs!

Here are some of the numerous benefits to be derived from this new feature: one-run processing; elimination of extra setups, reduced operator intervention, lessened processing time, increased versatility, simplified programming.

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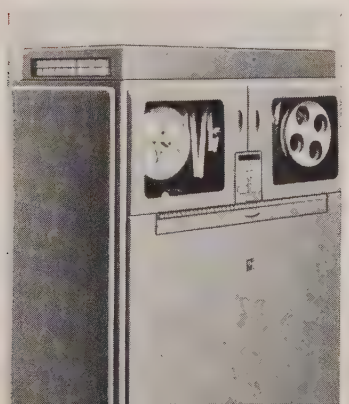
FEBRUARY 1960—Paper Tape Reader for Univac 60 and 120 Computers perfected by Univac

From Univac—a new development for today's modern business data processing—a common language Paper Tape Input device for Univac 60 and 120 Computers.

The new Paper Tape Reader permits data on paper tape to be fed directly into the computer. It processes common language paper tape prepared by tape-punching typewriters, wire communication equipment, and transaction recording and window posting machines, at the rate of up to 8800 characters per minute.

This new Univac unit completely eliminates the need for separate tape-to-card conversion, providing greater time-savings and money-savings in data processing systems.



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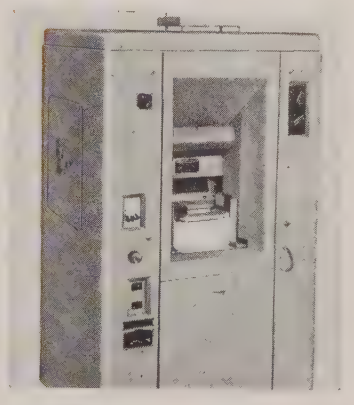
FEBRUARY 1960—Selective Posting Interpreter developed by Univac

Another major development by Univac in tabulating equipment—the Selective Posting Interpreter. This highly versatile machine senses information from a selected master card in a group of master cards, retains the information, and prints it on every card that follows. By control punching, sensing is suppressed from all other master cards. Once a setup has been made, it will be retained for printing on all cards until cleared by control punching. There are no limitations to the number of detail cards which can be printed from each master card group.



more to come from UNIVAC

This 160-foot tower is one of 12 repeater stations in Rio ←

The Railroad

The Rio Grande combines a computer, Teletype, microwave and facsimile system to produce "Shipper Facts."

A NEW electronic communications network that spans the towering Rocky Mountains and provides pinpoint control over all freight car movements on the line's 2,400 miles of track has been put into operation by the Denver & Rio Grande Western Railroad. The pioneer system, developed over the past four years at a cost of a million and a half dollars, combines a 715-mile, 18-station microwave radio system; the world's fastest facsimile sending and receiving equipment; a large-scale business computer; and a new nation-wide system of Teletype communications.

A. B. Dick Co., Burroughs Corp., Motorola Communications and Electronics, Inc., and Western Union combined talents and products with the Rio Grande to develop, install and perfect the complete system—first of its kind in the railroad history of America.

Principal objective of the electronic system—called "Shipper Facts"—is to provide faster freight car movement information to shippers and receivers through the railroad's national network of traffic offices.

Six seconds from Denver

Together with scientists and engineers of the Rio Grande and of Stanford Research Institute, A. B. Dick developed "Videograph," which uses an electrostatic printing technique and can transmit any document of any length over microwave, reproducing an exact copy at any or all of the railroad's six facsimile sending-receiving points in Colorado and Utah. Transmission time of a letter-size document is six seconds.

Linked to the microwave network—erected by Motorola—Videograph has enabled the Rio Grande

That Takes to the Air

to centralize control over the entire intermountain railway system at a new, modern electronic data processing center in the line's Denver headquarters. A Burroughs 220 computer, modified especially for the application, was installed to process all information received at the center.

Integration of the high-speed facsimile equipment, microwave transmission, EDP and private wire service enables Rio Grande to locate and transmit, in less than a minute, information on any of the 60,000 freight cars moving on the Rio Grande system. Some 30,000 moves are made each month.

The Rio Grande can locate and transmit information on any of 60,000 cars on the line in less than a minute.

Loaded or empty

Freight waybills, together with a "Code Strip" at the top of each copy showing date, time, train number, direction, station and connecting road is forwarded to the computer center over Videograph as soon as a train is ready to depart from any of the principal terminals on the Rio Grande system—Ogden and Salt Lake City, Utah; and Grand Junction, Pueblo, and Denver, Colorado. This information is key punched and stored on magnetic tape in a Datafile, one of the components in the 220 EDP system. The stored information includes: (1) Car ownership and number in which the shipment is moving; (2) Train number, date and time shipment actually moved; (3) Date and time car is received from and/or delivered to connecting railroads; (4) Date and time car is loaded and/or delivered at station on the Rio Grande system.

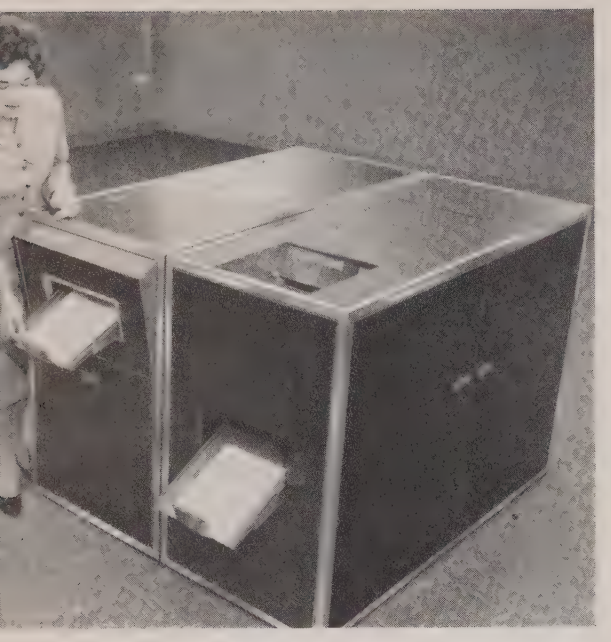
With this information, the Traffic Agencies or the Traffic Service Bureau can furnish immediate response to inquiries from a shipper requesting the location of his car, which may be moving or has moved over the line.

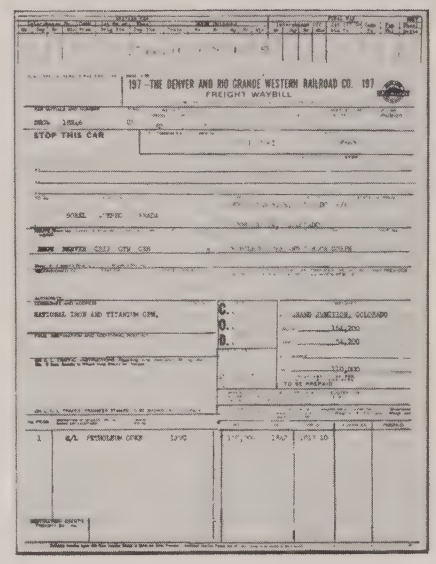
The inquiry is made of the Datafile either by Flexowriter or punched card. Burroughs has modified the 220 computer especially for the Rio Grande to permit interruption of regular processing routines to "interrogate" the Datafile. Answers are printed out of a Teletype printer in from 15 to 50 seconds per inquiry. However, the actual delay in computer processing is only eight to 10 seconds.

When an inquiry is made regarding a car which has not yet been delivered to the Rio Grande, the print out notifies the inquirer that his request is being "banked," or stored at the car number location in the Datafile. When the car in question enters the Rio Grande system and the car movement information enters the magnet tape file, the banked inquiry is printed out on the Teletype and the shipper or traffic representative making the original inquiry is immediately notified.

Information in the Datafile also includes the necessary statistics to accomplish Car Service Accounting. Every freight car, whether it is loaded or empty, earns rental for the company owning the car while it is in another railroad's possession. The amount is figured either on a per day or mileage basis. Each line must keep track of and accumulate the monthly rental, and prepare and forward to the owner company a report showing car numbers, amount earned by each car and total amount earned by all cars from that company. All computations required to complete car service records are performed by the computer.

The 220 also provides the carload inventory of




197—THE DENVER AND RIO GRANDE WESTERN RAILROAD CO. 197
FREIGHT WAYBILL
STOP THIS CAR

Videograph document transmission and printing units can send and print ten waybill copies per minute. Printing unit (right, in picture above) makes exact copies of original waybills, as shown by the illustration on the right.

principal terminals. When trains arrive at principal terminals, the car number, commodity, gross tons and final destination or connecting junction railroad on the Rio Grande are stored on magnetic tape by individual terminals. A request from the Superintendent of Transportation for a report of cars on hand in any terminal can be printed out at the rate of 150 cars per minute, providing him with a complete picture of business on hand and enabling him to analyze and move cars in the most expeditious and economical method possible.

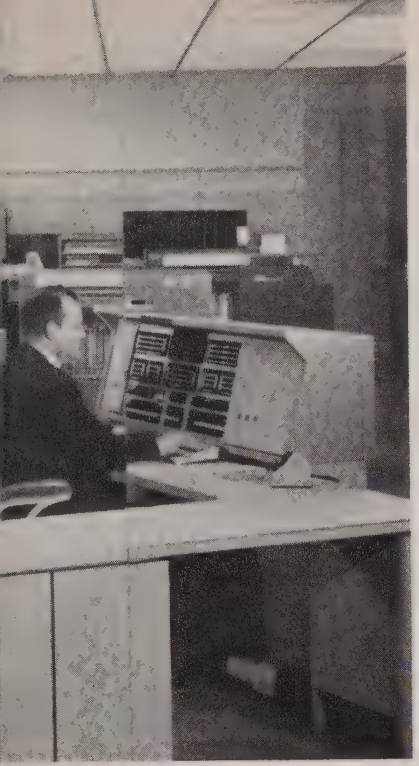
On top of the Rockies

The computer also will enable the Rio Grande to control operating expense on a day-to-day basis. A formula has been compiled and placed in the computer's memory that will compute the portion of revenue due the railroad for each carload shipment moved. Each waybill contains the total amount of revenue assessed for the shipment. If the shipment is local, moving from point to point on the Rio Grande system, all revenues accrue to the line. But if it is an interline or intermediate shipment, the revenue must be divided among all railroads who participated in the move. The computer will portion and accumulate the revenue on a daily and month-to-date basis.

A centralized bureau has been established at the Rio Grande's general office to prepare waybills from "faxed" copies of the bills of lading furnished by shippers at the five principal terminals. The waybill prepared in the bureau will be faxed back to the originating terminal and will be used to move the shipment.

On business concluded at the five principal terminals, a copy of the waybill which has moved the shipment will be faxed to the central bureau, where a freight bill will be prepared. Centralization of these functions will provide a more accurate freight rate on the original shipment and a more accurate freight bill.

Shipper Facts is another in a long line of "firsts" for the Rio Grande, which includes the first "Vista Dome" transcontinental train, the first railroad radio license and the first railroad research laboratory. Work on the electronic system started in 1957, when the line embarked on a study of the possible benefits a microwave system might offer the railroad. The decision was favorable and events moved rapidly. Motorola was selected as prime contractor for the entire system, and during late 1959 and early 1960, access roads and commercial power lines were built to the microwave repeater sites. Buildings, towers and radio equipment were installed. The Rio Grande



roughs 220 EDP system at computer
er includes paper tape reader, punch
input-output "Cardatron" units and
e individual tape storage units that proc-
interchangeable reels of magnetic tape.

Motorola, prime contractor for the entire microwave network, final-tested the giant system under actual operating conditions before delivery and installation. Facsimile signals are applied directly to the microwave baseband through special termination equipment developed, tested and installed by Motorola.

system includes 12 repeater stations, eight installed on mountains to take advantage of already existing heights and four on relatively flat land. One of the repeater stations—the highest known microwave station in the world—is located on the top of School of Mines Peak, 12,470 feet high astride the Continental Divide, where winds reach a 200 mph velocity.

During this same period, a staff of four systems analysts were put to work to set up procedures for data processing and select EDP equipment. The railroad had used punched cards for 35 years and the installation included an IBM 650 computer, but it was soon discovered that a computer of faster speed, larger memory and more accessible storage capacity was necessary.

Service is their business

The Burroughs 220 was selected after extensive trips to installations around the country and detailed studies of all available equipment were made. Payroll, freight accounting, car service records and other applications were converted to the 220 in January, 1961. The systems analysts now report to the director of data processing, who in turn reports directly to Rio Grande's president. The director of data processing formerly was assistant controller and the data processing operation formerly was part of the controller's department. The change in organization was in line with the railroad's concept of EDP as a service bureau to the entire organization and not necessarily as an accounting auxiliary.

In addition to utilizing the microwave system for transmitting facsimile information, the Rio Grande initially has established 12 voice communications circuits to provide the road with telephone and teletype service between designated points. Plans to tie wayside-train VHF two-way radio operation into the microwave system are presently being formulated. The system can be expanded to 120 channels, not including those used for carrying facsimile information.

The Rio Grande is recognized as one of the most efficient railway systems in the country, and the road's 1960 earnings substantiate the recognition. Gross revenues of $76,316,359 netted $8,608,-965, ranking the Rio Grande fourth in the nation in translation of gross to net railway operating income. The road handled 434,615 carloads of freight in 1960, a gain of 5,381 cars over 1959. Net income was down less than one percent, compared with a 22 percent decline for the railroad industry. ■

16

DECEMBER 1960—COBOL goes into action with help of Univac

During a demonstration conducted December 6th and 7th, before the Executive Committee of the government-sponsored conference on Data Systems Languages, Univac played a vital role in what was called "an important milestone in the progress of data processing."

Using COBOL (Common Business Oriented Language), our technicians programmed the Univac II in English to display the practicality of COBOL as an effective programming language for business-type problems. This same Univac COBOL program, with minor modifications, was then successfully compiled and run on another manufacturer's computer system.

With Univac COBOL your employees can learn to program in days instead of weeks, program changes are made more accurately and faster, and programming costs are substantially lower.

17

DECEMBER 1960—New Univac laboratory houses one of the largest computation centers in the world

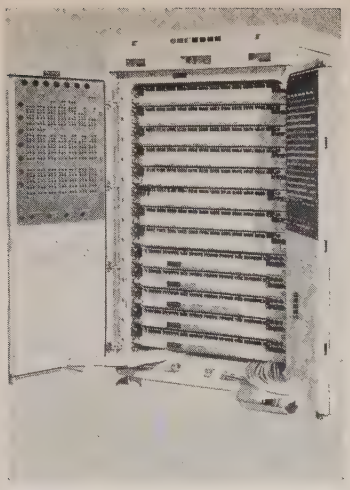
Univac's new Engineering Center in Whitpain Township, Pennsylvania, features one of the world's largest and most complete computer centers. When completed, this modern fully-equipped research and development facility will contain working installations of the full spectrum of Univac equipment. Keeping pace with the Univac program of planned growth, this new center covers over 300,000 square feet of floor space with adequate room for expansion. The facility serves as a work center for engineering and programming projects, and also aids in strengthening our continuing program to provide you with better, more advanced service.

20

AUGUST 1960—Univac develops advanced Real-Time Computer for U.S. Navy

A new, extremely compact electronic computing system which collects, processes, and evaluates naval tactical data—and recommends courses of action in virtually "zero" time—has been developed for the U.S. Navy by Univac. One of the fastest computers ever built, it completes an instruction in only 20 millionths of a second. A general-purpose, stored-program computer, its random-access memory can hold one million bits of information. Thirty of these bits may be extracted from any location in the memory in only 2.5 millionths of a second!

20



DECEMBER 1960—Univac perfects new Military Real-Time Computer

The Univac 1206 Military Real-Time Computer is a general-purpose computer built to rigorous military environmental specifications. It operates under the most severe conditions of shock and vibration — on ships, submarines, airplanes, trucks, trailers, and rail cars. Typical applications include: technical data analysis, range instrumentation, real-time guidance, tactical control, and other applications where rugged construction and high computational ability are required. Designed for processing large quantities of complex data, the Univac 1206 employs random access storage of information. Average execution time for an instruction is 14 microseconds.

18

SEPTEMBER 1960—Target Intercept Computer designed and developed by Univac for Nike Zeus anti-missile missile

Univac, working in close cooperation with Bell Telephone Laboratories, has developed a military high-speed, high-reliability computer for guidance of the Army's Nike Zeus anti-ICBM missile.

Speed, accuracy, and reliability are key factors in this system. Speed because once a target missile is detected, only minutes remain in which to intercept and destroy it. Accuracy because the Univac computer must fix launching time, project exact intercept time and place, and send steering orders to guide the Nike Zeus to its target. Reliability because the Univac computer must continue to adjust its computations up to the last moment of guidance, when the target missile is destroyed.

19

5 major developments in systems

6 major developments in peripheral equipment

4 major developments in tabulating equipment

5 major developments in computer engineering and facilities

FROM UNIVAC

DIVISION OF SPERRY RAND CORPORATION

...and more to come in '61!

For More Information Circle Reader Service Card No. 165


NO. 2 TIN MILL DELAY DESCRIP

Youngstown tin plate mill uses Univac system, 81 punched cards to get maximum efficiency from office, plant and warehouse.

A Warehouse of Cards

A VAST number of combined skills go into the making of tin-plated steel, not the least of which is the skill involved in getting the right order to the right customer at the right time.

Since producers of tin plate customarily maintain warehousing operations for their customers, it is imperative that they be able to determine—at all times—where a customer's tin plate is, how much of each type is on hand, and how soon the customer can get the type of plate that he wants. This job is complicated by the demands of thousands of customers—of every size and variety—buying thousands of different types of plate.

Youngstown Sheet and Tube Co., seventh largest steel producer in the United States, makes 8,000 types of tin plate. And yet, through the use of a Remington Rand Univac Model 60 computer, Youngstown's Indiana Harbor (Chicago district) plant has improved its inventory and production control operations to nearly 100 percent efficiency. The industry norm is 90 percent.

One of the first of the major steel producers to turn the accounting problems of an entire plant over to electronic data processing equipment, Youngstown installed the Univac in 1955. At that time, it was one of the first to be delivered anywhere in the country.

The Indiana Harbor data processing system includes a separate tab department at each of the plant's two mill locations. The operation of these two tin locations largely center around each plant's data processing department. Ultra-modern electrolytic tinning lines are capable of producing tin coatings as light as a quarter of a pound per 100 pounds of steel; and throughout the manufacturing process—in fact, from the time the raw iron ore and limestone reach the plant's docks until the finished products are shipped to customers throughout the west and the midwest—punched cards take meticulous care of the accounting operation.

Cards on each lift of tin plate readied for shipment are checked against master sheet.

The tabulating department includes a staff whose responsibility it is to account for everything from payroll and taxes to shipping weights and production variances.

To do this job, the department utilizes 81 different varieties of punched cards—24 for maintaining payroll, cost, employe and insurance records;

ngstown's Indiana Harbor plant is of the world's first to be run

23 for maintaining production control standards; and 34 for maintaining the necessary level of inventory control.

Monthly warehouse reports keep all salesmen in close touch with their customer's changing needs, and electronic data processing allows the plant to take two physical inventories each year —a task that is difficult with manual methods.

The data processing department gives all department heads and customers vital inventory information every 24 hours. Each day at 8 a.m., the plant knows what materials were shipped the day before, what were produced the day before, and what inventory was on hand at the beginning of the day.

Ticketed "on location"

As each order comes in from a customer, punched cards are reproduced in the tin mill warehouses to shepherd the order through various production processes. A master name card, filed by order number, allows the collating reproducer (Robot) to gang-punch a specific number of cards for each type of order to be processed.

Every order contains a multiplicity of information about the type of steel to be included. The Univac computer simplifies the maintenance of this information.

Using a reproduced set of punched cards, the computer explodes the order into the number of packages required, the theoretical weight per package and the weight in warehouse (both in coils and in cut lengths). It then provides each department with the necessary cards to process that order.

The warehouse foreman gets a summary sheet showing how much steel is on order, and the shipper is informed so that he can figure out how many cars he can release.

As a typical order comes off the shear line (end of the production line), it is ticketed with three tab cards before going "on location" (in the warehouse). These three cards accompany the order until it is ready to leave the plant.

Hooker pulls the red stripe

In the warehouse, a red-striped card is pulled by the hooker when the order is placed on location. A green-striped card goes to the tab department when the order is shipped out. A yellow card goes to the customer with the shipment.

Every 24 hours, a group of green-striped cards

Youngstown's "post office" routes all tab cards necessary in production, warehousing and shipping of tin plate from plant.

is turned in to the tab department for each of the day's three shifts at each mill. There, an updated daily report is produced for every order handled that day.

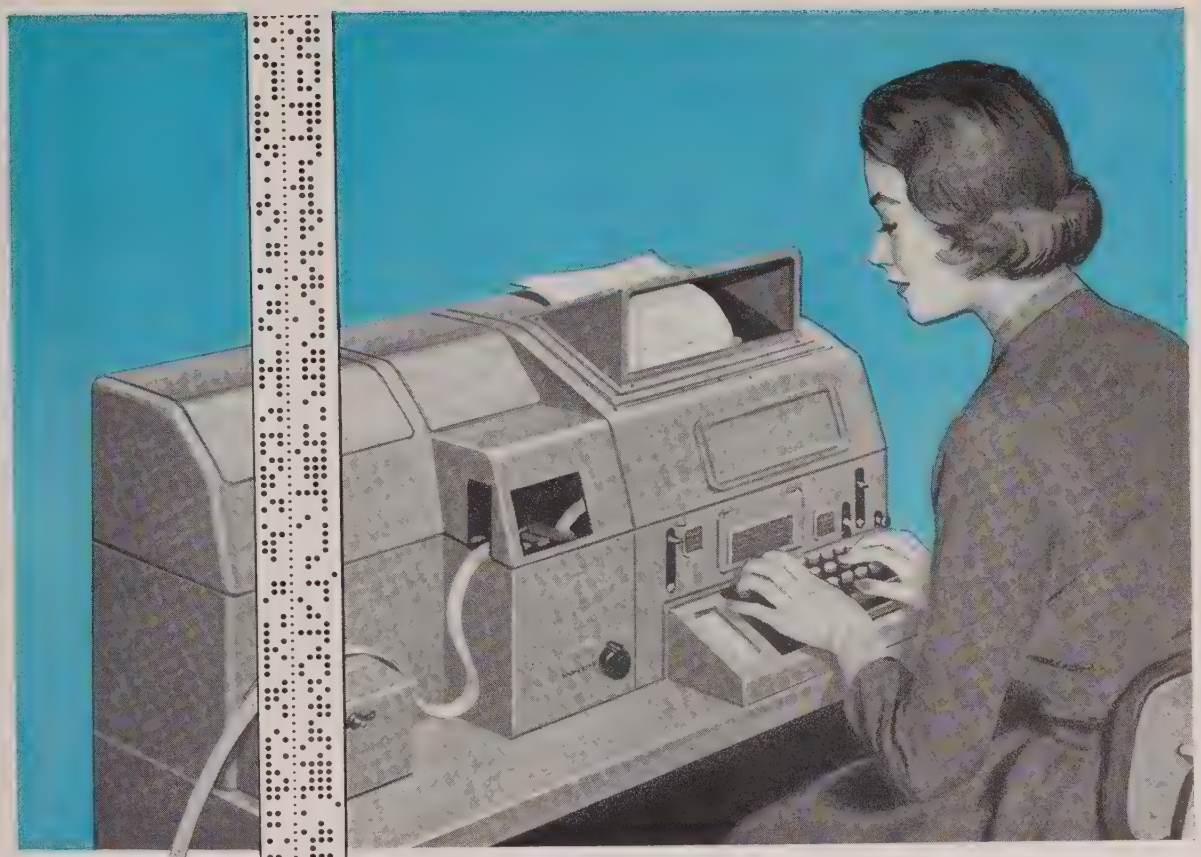
To accomplish an inventory, all cards to date are processed. Then the cards are sorted by warehouse row and bay and the updated cards are fed into the alphabetical tabulation (100 lines a minute), which prints out the completed inventory form. These forms then can be used by inventory clerks to check both tin mills against all finished tin plate on hand.

Use of a printed sheet, replacing stacks of tab cards formerly required to take inventory, greatly simplifies the operation, and as a result, considerable time and manpower are saved and errors are virtually eliminated.

Accounting people can go through warehouses in a short time, and there is a minimum of writing to be done because the printer already has accomplished most of the work.

There also is a considerable time saving for warehouse personnel in locating the places where certain runs are stored. For example, when a

Continued on Page 67



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Perforator and Computer Tapes • Single Copy Printer Papers
Multi-Copy Printer Papers

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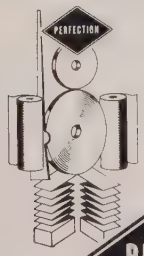
INVENTORIES IN 90 LOCATIONS

PERFECTION IS YOUR PROTECTION



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For More Information Circle Reader Service Card No. 169

Western Reserve's GE 225 computer now produces data 2,000 times faster than previous systems.

News Feature

Western Reserve Up-dates Information Retrieval Center

THE world's most advanced information retrieval system was introduced last month at Western Reserve University, Cleveland.

Consisting of a GE 225 computer, a dual magnetic tape handler and tape controller, a high-speed punched card input, and an electric typewriter output, the system is the first of its type to be installed anywhere in the world for purposes of literature searching.

Western Reserve's system is installed in the Center for Documentation and Communication Research at the university's School of Library Science.

The GE 225 system replaced the university's Searching Selector, a relay machine designed in 1955 by J. W. Perry, the first director of the Documentation Center, and Allen Kent, present associate director. The speed of the GE 225 is about 2,000 times faster than that of the Searching Selector, which could read 30 documents an hour.

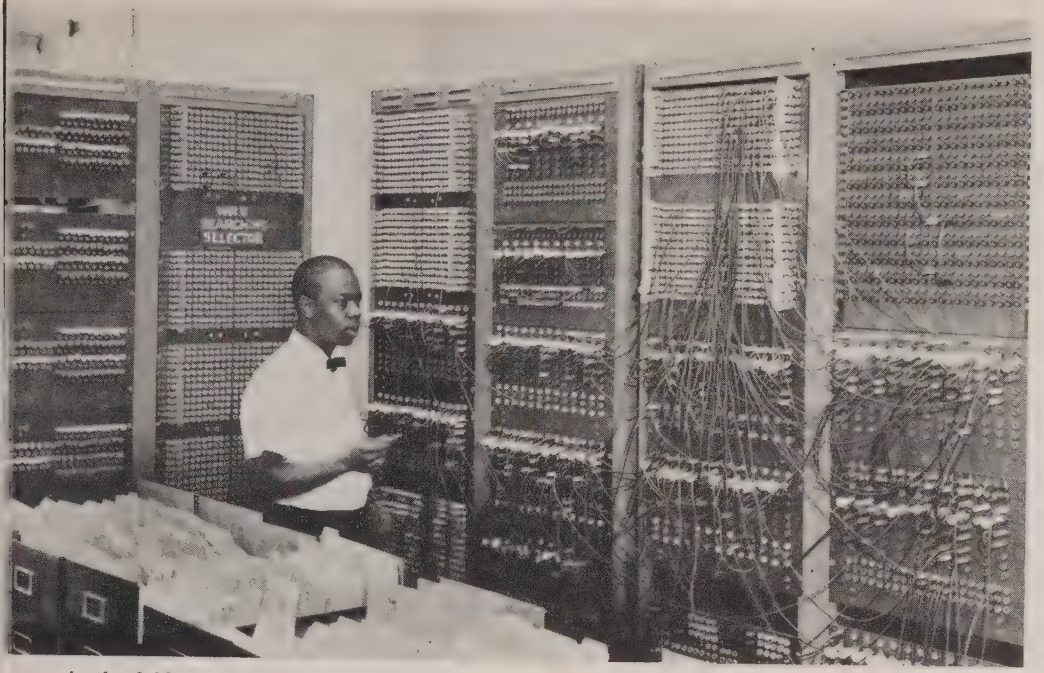
If you read, you lose

In announcing the installation of Western Reserve's system, Kent declared: "For every 60-second period during the day and night—Saturdays and Sundays included—it is estimated that 2,000 pages of books, newspapers or reports will have been published somewhere in the world. If one attempted, through reading, to keep fully informed of everything going on in the world, it is estimated that he would fall behind by more than a billion pages every solid year devoted to reading."

The problem of keeping man and industry abreast of this "literature jungle" first prompted Western Reserve to initiate its information retrieval program in 1955. During the past six years, their Searching Selector and the techniques employed thereon have opened an entire new field of abstracting, encoding, programming and searching to the science of information retrieval.

The Documentation Center has four primary aims: (1) research in information retrieval requirements through machine and manual methods, (2) education of documentation specialists, (3) dissemination of information on research results in all aspects of information handling, and (4) the conduct of operational services in several subject fields.

One subject field already being



oneer in the field, the relay-operated Searching Selector designed by J. W. Perry in 1955 could handle only ocuments an hour.

serviced by the Documentation Center is that of metallurgy. This project is being financed by the American Society for Metals, which has supported Western Reserve to the extent of $150,000 since the Documentation Center was founded in 1955.

Allan Ray Putnam, managing director of the ASM, is extremely aware of the need for information retrieval development, particularly in the sciences. At the ceremonies introducing the GE 225 system, he said:

"The importance of solving this information problem can be stressed most strongly by reviewing Soviet Russia's non-mechanized, non-electronic, but nevertheless effective information 'machinery'. This is predicated upon a large-scale, government-operated, highly regimented information center through which every useful bit of technical information is funneled directly to the Russian scientists and engineers.

"We have no clear concept of the internal workings of this human information machinery, but we do know that it works. If our information systems are to work better, then we must devise and utilize techniques which will put all the world's accumulation of information into our technicians' hands as effectively and as rapidly as possible."

Through Western Reserve's Documentation Center, participants in the ASM "Documentation Service" can receive abstracts of all material pertaining to their field and affiliated fields within two or three weeks after publication. This material—technical articles, patents and other documents, both English and foreign—are being abstracted by Western Reserve experts at the rate of 36,000 per year.

Ask me in semantics

Using a semantic language devised by Western Reserve for this program, the abstracts are "translated" for use in the computer. Punched into cards, this unique machine language then is transferred to magnetic tapes.

When a question is sent in by some member of the ASM, it too is translated into machine language and fed into the computer. The answer—or answers—are printed out by electric typewriter.

More than 27,000 abstracts have been delivered to a total of 157 ASM subscribers.

The ASM is not the only organization using Western Reserve's information retrieval system, however. The American Diabetes Assn. utilizes it to search diabetes literature. The National Institute of Health has inaugurated a pilot system of machine searching on communicable diseases. Cooperative projects are under way with the Western Reserve School of Law (in the field of law) and the University of Arizona (in the field of electrical engineering).

Dr. C. Walter Stone, director of the Educational Media Branch, U. S. Office of Health, Education and Welfare, was on hand at the meeting which introduced the new GE 225 system.

"A few years ago," he commented, "the Hoover Commission established that the Federal Government produces 25 billion pieces of paper each year. One sixth of our gross national product is devoted to paper handling."

Stone's department has a stake in the development of information retrieval techniques, too. It uses the Western Reserve system for regular educational searches.■

Paul B. Wishart, president, Minneapolis-Honeywell Regulator Co.: "Computers are a field of technological application that could have an impact even greater than atomic energy as far as business is concerned."

Honeywell

Continued from Page 29

Northern Illinois Gas Co.

In the spring of 1960, Honeywell announced specifications for the 400 computer, a moderate-price unit that Honeywell officials estimated would make EDP practical for as many as 6,000 of the 10,000 top companies in the U. S. Early in 1961, design changes in the 400 were announced that would double its capabilities without increasing the cost of the system.

The prototype of the 400 is scheduled for delivery in September, and four or five systems will be "on site" by December of this year. In all, Honeywell is committed to manufacture and deliver some $51 million worth of 800 and 400 systems in 1961, the majority of them 800's.

Why do firms select a Honeywell computer? A typical answer comes from Ronald S. Edwards, Jr., vice president, Title Insurance and Trust Co., Los Angeles. His company's application involves daily updating of a very large magnetic tape file containing all real estate tax data on 1.8 million parcels of land in Los Angeles county. In addition to the updating function, the system is required to produce, on a daily basis, tax reports which are used in conjunction with policies of title insurance. Another daily reporting function involves the creation of tax notices, which are sent to real estate lenders, informing them of new taxes and delinquencies.

Says Edwards: "The major characteristics of interest to us in a computer were (1) a high magnetic tape input-output transfer rate in order to pass our very large file on a daily basis and in a one-shift operation; (2) great computational speed in order to make out complex tax delinquency calculations without the computer becoming 'computer limited'; (3) an adequate memory to accommodate large programs which involve a great variety of transactions and reports; (4) ability to expand into additional applications without making the computer obsolete; (5) ability to operate more than one program at a time without requiring a supervisory program; and (6) availability of easy-to-use automatic programming tools."

A substantial portion of Honeywell's investment in the EDP field is going into the development of various programming aids or "software." In the earlier years of EDP, the cost of programming frequently was as high as the cost of the hardware. Honeywell was determined to off-set these high costs, feeling that work in this direction was equally important to the development of top quality hardware.

Sub-routine library

Currently, there are more than 200 Honeywell people working on various phases of its software projects. In addition, the country's top specialists in automatic programming have been engaged to work on specific projects. Among the firms so engaged: Applied Data Research, Inc., Princeton, N. J.; Computations, Inc., Boston; Computer Sciences Corp., Los Angeles; and Computer Usage Co., Inc., New York. These combined efforts have produced an impressive software package for the 800 and an equally efficient package for the 400 systems.

Perhaps the outstanding accomplishment is FACT (Fully Automatic Compiling Technique), developed for the 800. Honeywell describes it as "the industry's most advanced automatic programming aid for business data processing." The instructions are prepared in basic English and it provides an easy and uniform method of handling all aspects of data processing, including input editing, sorting, processing of variable length records and report writing.

The 800 also has an Algebraic Compiler, similar to FACT in function, for programming scientific and mathematical problems. The program uses the same scientific language used on several other computers and the sub-routine library consists of routines commonly used in solving scientific problems. Any existing programs written in this language can be run on the 800.

"National EDP University"

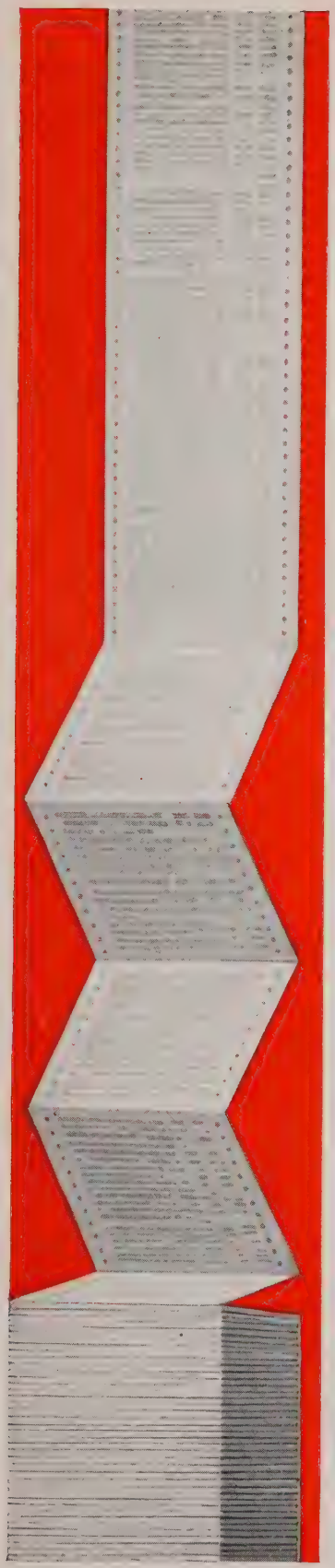
Other programming aids for the 800 include LAMP (Library Addition and Maintenance Program), to permit modification of existing library routines and addition of Honeywell and customer-created programs to the library; IBM 650 and Univac I and II Simulators, which make it practical to run programs written for these machines on the 800 without program modification; PTS (Program Test System), developed to streamline program check-out and obtain maximum usage of computer time and permitting, without human intervention, automatic "batch" check-out of a series of programs to detect clerical and logical errors to make certain programs are feasible.

In addition, Honeywell has developed ARGUS (Automatic Routine Generating Updating System) and Scientific Routines. COBOL (Common Business Oriented Language) also will be implemented for both the 800 and the 400.

Software for the 400 will center around EASY (Efficient Assembly System). EASY will be completely integrated and supplemented by sort and collate generators, an automatic check-out system and executive, program tape file maintenance and library maintenance routines. Honeywell's Algebraic Compiler will be adapted to the 400 as a scientific language.

In line with Honeywell's policy that "the job isn't done until the product is in intelligent use," the EDP division has undertaken a very

Continued on Page 46



NOW!

A new RCA EDP Printer that's 67% faster!

for no more than the price of an average printer

Printing is a tough, all-important job in business data processing. This new high-speed printer will handle anything that normally would run through an electronic data processing system . . . up to 67% faster than previous RCA printers, standard or wide forms.

Available for the RCA 301 and 601 EDP Systems, here's what this new printer will do:

- Operate up to 1,000 lines per minute when printing 47 different characters.
- Operate up to 800 lines per minute when printing 64 different characters.
- Printing is done at 10 characters per inch.
- Printing alignment and print quality are excellent.
- An original and 5 highly legible copies can be made.

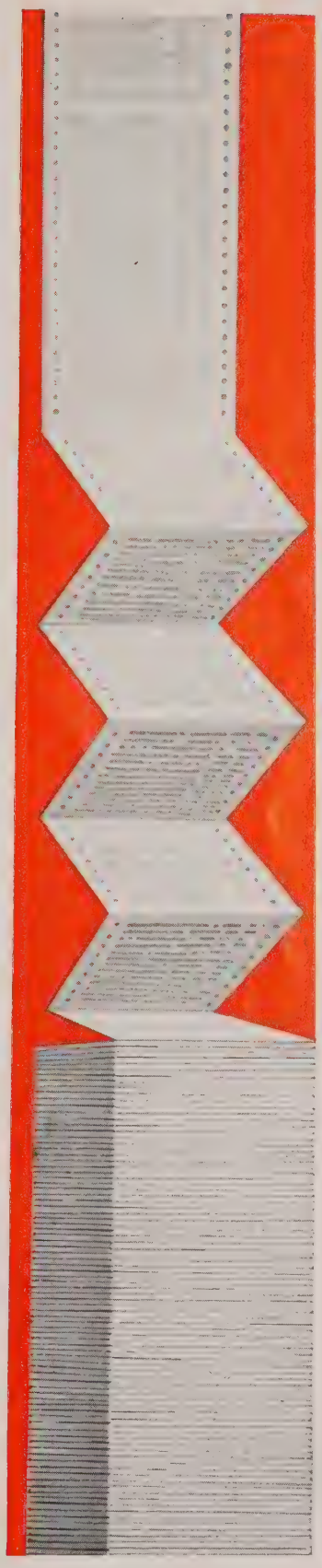
To handle wide forms, an optional 160 position print head is available, as well as the standard 120 print positions.

Introduction of the new high-speed printer, achieving new economics in EDP printing, is another example of RCA's responsiveness in meeting your needs for *better* EDP results at *less cost*. For information write RCA Electronic Data Processing Division, Camden 8, New Jersey.

RCA®

The Most Trusted Name in Electronics

RADIO CORPORATION OF AMERICA



Honeywell

Continued from Page 44

extensive educational and field service program in conjunction with the marketing of its general purpose computers. The division has established a "national EDP University" to train its own and customer's personnel. At present, a staff of about 50 instructors are working full time at Honeywell's Marketing and Education Center; at Field Service headquarters in Boston; and at branch sales offices country-wide.

The newly-expanded Marketing and Education Center has the staff and facilities for the simultaneous training of up to 250 people. Facilities include 10 modern classrooms and a data center now equipped with an 800 system and soon to have the addition of a 400.

Since establishing its training program four years ago, the division has given diplomas to some 2,500 people. Special training in various phases of EDP has been given to thousands of additional people. Many hundreds will receive training in the current year.

The division's educational efforts are concentrated in three major areas: customer training, in-service training and field service training.

Basic objectives of the in-service training program are to develop a hard-hitting and flexible marketing organization to sell Honeywell EDP systems and to work with customers and prospects on their application problems.

"Second to none"

The purpose of the field service training program is to develop personnel to maintain, program and operate Honeywell EDP systems in customer installations.

Personnel are recruited from leading technical schools and are given a basic six to eight-month course in the general principals of digital systems, programming and the Honeywell 800 and 400 systems.

The field service department plans to train, or start training, as many as 400 new field service engineers during 1961, which will double the size of Honeywell's field service and systems test staff. The EDP division feels that it has earned a "second to none" reputation for its maintenance of the Datamatic 1000 systems, which have all been in successful operation for several years, and is bent on maintaining that reputation as new systems go into operation.

48 acres in Billerica

Honeywell's success in the computer market has resulted in a period of almost explosive growth for the EDP division. Employment has increased from 850 in January 1960 to more than 3,000 at the present time. The division's physical facilities are growing at an equal rate. The Engineering and Research Center at Newton Highlands, Mass., where both the 800 and 400 were conceived and designed, is now staffed with some 500 engineers, mathematicians, scientists and technicians. In addition to the main manufacturing plant at Brighton, a section of Boston, a second manufacturing facility has been opened at Lowell, Mass. The EDP Division concluded purchase of 48 acres of land in Billerica, Mass., with plans for construction of a new plant that will accommodate 650 workers.

Forefront of R & D

In Wellesley, the Marketing and Education Center houses the national sales and education organizations as well as the division's executive offices. The center includes two large office buildings and a service bureau equipped with an 800. The marketing staff currently consists of around 500 people. The EDP Division maintains branch sales offices in all principal cities in the U. S., and in Toronto and Montreal in Canada.

Guiding Honeywell's progress in the computer industry is Walter W. Finke, president of the EDP Division. Finke joined the company in 1950, headed its Ordnance Division and then the Power Transistor Division. Later, he became assistant to the president.

In 1955, Finke was named vice president and general manager of the newly-formed Datamatic Corp. He later was appointed president of Datamatic and retained that title when the name was changed to the EDP Division. In 1957, he also was made a vice president of the parent company.

Finke is fully aware that EDP is still in its formative years and that only those companies that stay in the forefront of the research and development effort can remain competitive. It is to this end that he maintains a large engineering and research staff, which is strongly supported by the corporate Research Center at Minneapolis.

One result of this extensive research program has been Honeywell's emergence as a leader in the field of high-speed thin film memories. The development program is at a point where the thin film units can be produced reliably and uniformly in large quantities.

Born of success

The EDP Division also has developed the Honeywell 290, an industrial process digital computer marketed by the firm's Special Systems Division. The 290 makes it possible to automatically control an entire industrial process, or even an entire plant. A system soon to be installed by the Philadelphia Electric Co. will calculate demand, apportion the work load for each generator in the most economical manner, and figure the charges involved when Philadelphia Electric exchanges power with neighboring utility companies.

Under Finke's direction the company has opened a European EDP office, Honeywell Controls, Ltd., at Greenford, England, and will soon establish a service bureau equipped with an 800 system in London. The firm will market its 800 and 400 systems throughout Western Europe, offering them for delivery within 15 to 18 months after date of order.

Honeywell, long a producer in the European market, is one of Britain's largest manufacturers of industrial control devices, and also produces a large share of automatic control equipment in France, Holland and Germany.

"Our entry into the European EDP market is a logical extension of Honeywell's other operations in the area," says Finke.

Finke believes that EDP is poised for a period of great and rapid growth in the decade ahead and that Honeywell's rapid expansion in the business will continue. He adds, with a confidence born of success, "We intend to be one of the industry's foremost producers of EDP systems." ■

Messages sent on the Fairchild Scan-A-Fax facsimile system can include any type of copy, including memos and photos.

Copy received on Scan-A-Fax Recorder unit is automatically run up to the display easel for removal.

Fairchild Completes Transistorized Facsimile

Product Preview

A COMPLETELY transistorized facsimile communications system, first of its kind for rapid transmission of graphic data, has been demonstrated by the Industrial Products Div. of Fairchild Camera and Instrument Corp.

The Fairchild Scan-A-Fax system consists of a flat-bed scanner-transmitter and a recorder, both transistorized and utilizing printed circuitry. Day-in, day-out, 24-hour operating is said to be the advantage of the development.

Scan-A-Fax accepts all types of copy, handwritten or printed, as well as charts and photographs. A new flat-bed scanning system permits transmission of this copy in any width up to 8½-in. in almost unlimited length. Transmission speed of the unit is 1.8 linear inches per minute, except on microwave or telephone program channels, where twice that speed may be obtained.

Special feature of the Scan-A-Fax scanner-transmitter is its "Rapid-Index," which allows the operator to selectively scan any portion of a letter, chart, log or graph, skipping unnecessary data. American Airlines, which has had the system on a test basis in their cargo handling department, says that this feature alone increased their copy-handling capacity by over 40 percent.

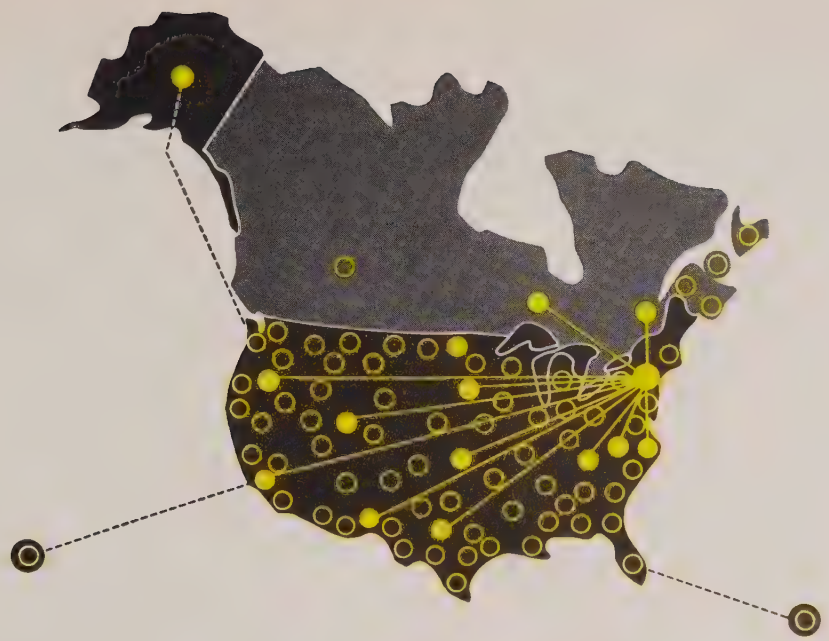
The Scan-A-Fax recorder provides a high degree of resolution, including small typewriter faces, fine grids and map lines, and will record up to nine tones of photographic grey scale.

An exclusive "Rapid Run-up" feature is considered a time-saving device on the recorder unit. Upon completion of the transmission, a signal is flashed to the recorder, which automatically runs the transmitted copy up to the display easel, from which it can be removed immediately. Later, when new copy is inserted into the scanner-transmitter, the recorder goes into recording condition, automatically advancing the paper to recording position.

Equipment is sold direct or leased, with maintenance and periodic up-dating of equipment. Applications include bills of lading, reservations, daily production reports, payrolls and inventory controls. Circle No. 102

PROBLEM:

to process away-from-home claims
for 83 Blue Cross Programs



SOLUTION:

a Western Union Private Wire System

Health insurance has become as widespread as the Blue Cross insignia . . . with 56,000,000 people in the United States, Canada, and Puerto Rico insured by 83 participating plans. Because Blue Cross protection travels with subscribers everywhere, a serious communications problem arose for this fast-growing organization: *How to process out-of-area claims with all possible accuracy and speed.*

A Western Union Private Wire System was the answer. Now—to process 23,000 claims daily—46,000 written messages travel over 22,000 miles of wire. Claim "okays" that formerly took hours now take minutes.

Through the work-saving advantages of this Western Union Private Wire System, Blue Cross Headquarters estimates savings of $975,000 a year on claim-processing alone.

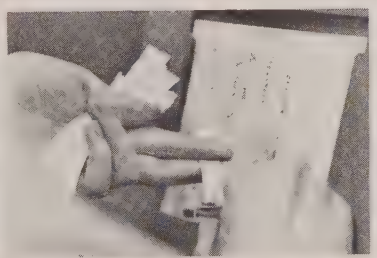
So useful has this system proved for all inter-plan communications that capacity was raised recently to 216,000 words per day. That's an increase of almost 500% over 1959.

Couldn't your company—like Blue Cross—save both time and money and provide better service with a Western Union Private Wire System? It will be a system *specifically designed* for your company's communications needs.

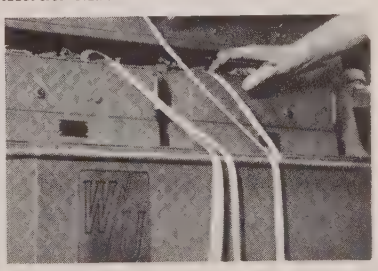
For all the facts, without obligation, wire collect to: Western Union, Private Wire Division, New York, N. Y.

How Blue Cross claims can be serviced from 50 states, Canada and Puerto Rico

10:52 A.M. Request for claim information is sent over a high-speed Duplex System, which permits simultaneous sending and receiving, from any of 107 offices.



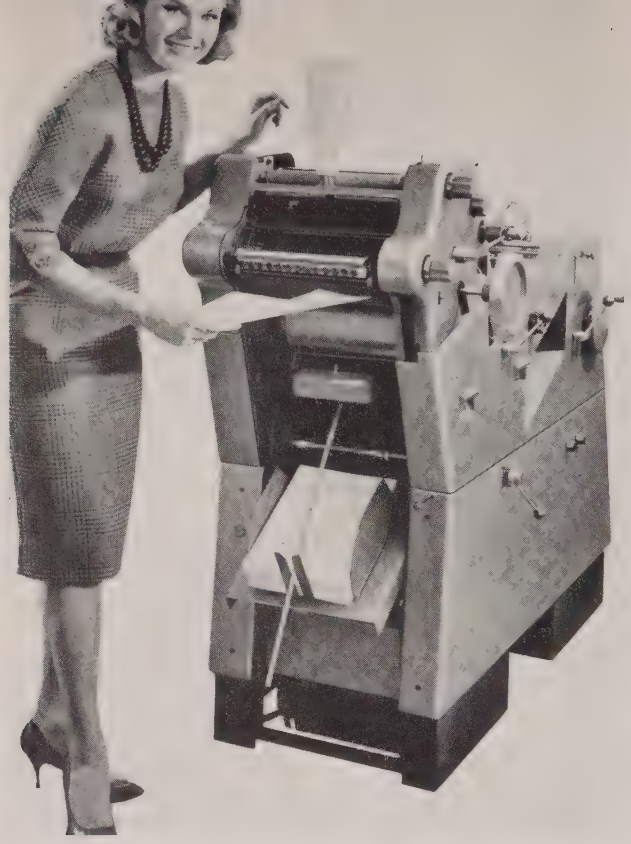
10:54 A.M. Received at Blue Cross Private Wire "Braincenter" in New York City, message is instantly forwarded to member-plan covering patient.



10:59 A.M. Wire reply comes back to "Braincenter" from local Blue Cross plan on perforated tape, and is then immediately relayed to the originating hospital.

WESTERN UNION . . . first in Private Wire Systems

For More Information Circle Reader Service Card No. 163



Smaller, low cost, office offset duplicator, Model ATF 1015 features combine efficiency and economy.

Largest of new equipment offered by American Type Founders—Chief 15 Offset Duplicator.

Type Founders Offer Machines to Business

Product Preview

AMERICAN Type Founders Co., Inc., has established a new Business Equipment Div. to provide the office market with a new line of equipment in the offset reproduction field.

Nucleus of the ATF line is the Chief 15 offset duplicator. Besides economy and simplicity of a duplicator, the equipment is designed to include the fine reproductive quality of a printing press.

Sheet sizes from 3 x 5-in. to 11 x 15-in. can be handled from routine black and white to quality color work.

Operation is said to be easy and the equipment capable of handling quality work at high speeds. Exclusive register control devices allow it to be run at speeds higher than normally expected for halftone and color work, and a 10-position speed control lets the operator choose the right printing speed for the work, from 3400 to 7200 impressions an hour.

All controls on the Chief 15 are grouped on the operator's side of the equipment. Every normal operating adjustment can be made from this position. For instance, controls allow side guides, tapes and paper guides to be moved simultaneously while the duplicator is running. Another control on each cylinder adjusts tension on plates and blankets.

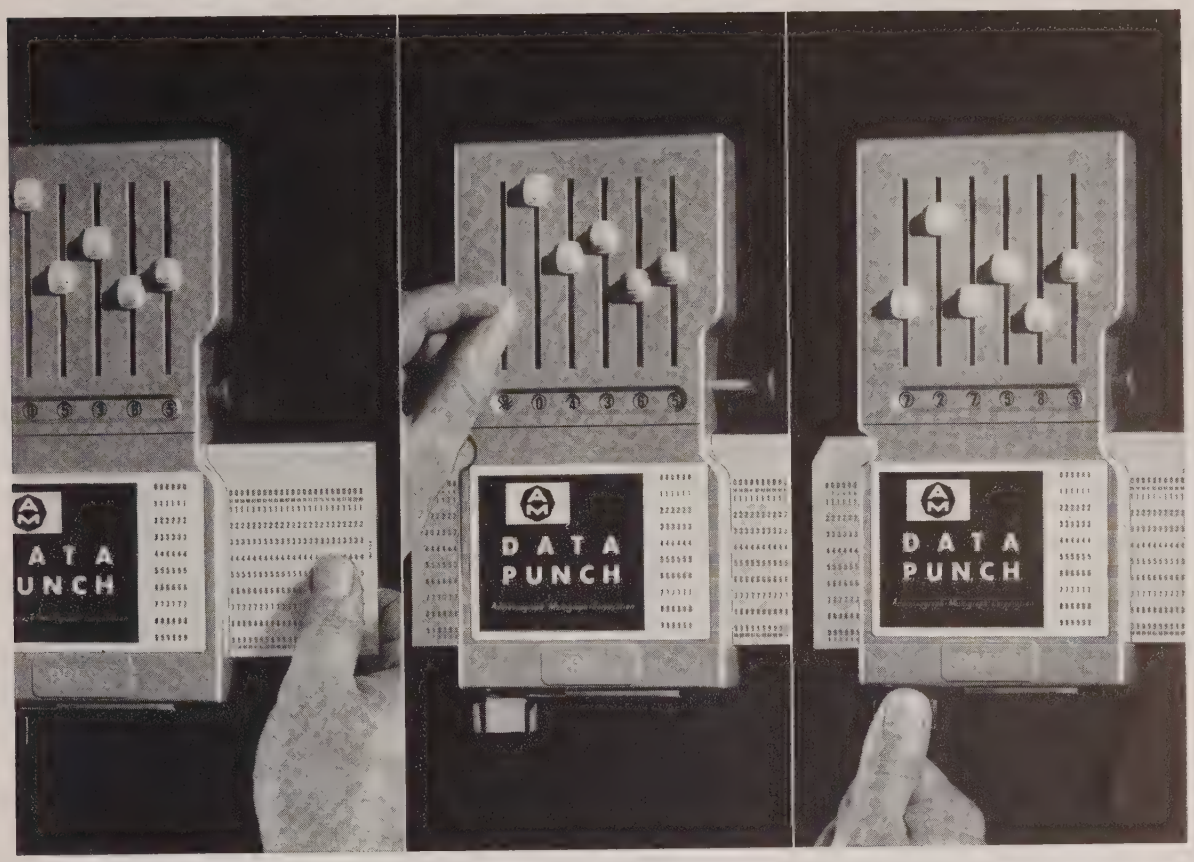
The Chief 15 requires only one lever to control both water and ink form rollers. In order to stop or start the feeder conveniently, the operator is provided with three control positions—one at the normal operating position, one at the feeder and one at the delivery end.

Any of the pre-sensitized and direct image plates for which the duplicator was designed may be changed in less than one minute.

Companion to the Chief 15 is the compact model ATF 1015 offset duplicator, its primary feature being its simplicity of control, contributing to the model's ease of operation and economy. Similar to the 15, it requires no tools for normal operating adjustments. Attachment of plates and blankets is accomplished by simple finger-tip controls.

In addition to the products already described, the Business Equipment Div. distributes a full line of process cameras, platemakers, paper cutters and other equipment and supplies necessary for the establishment of a complete office reproduction department. Circle No. 101

NEW ADDRESSOGRAPH DATA PUNCH



1. Place tabulating card — or multiple part set — in machine. Select area to be punched by means of field indexing gauge.

2. Enter variable data to be punched and printed by positioning keys. Digits visible on dials for quick pre-verification.

3. Press operating lever lightly to punch and print. Lock key assures precise punch registration. No power required!

Collects variable input data **in machinable form** right at the source . . . accurately, speedily, at low cost

Here is the first truly portable Data Punch . . . that gives you an accurate, low-cost way of collecting variable data from multiple, decentralized sources.

The new Addressograph Data Punch provides a completed, accurately-punched card document — ready for input to any data processing system without verification or other intermediate steps. Punches any field of up to 6 columns of data at a single machine stroke — punches additional fields by simply repositioning the indexing gauge. Convenient carrying cases available for all models.

To obtain full information on the many advantages of the new Addressograph Data Punch, or for systems counsel, just mail the coupon.

Addressograph-Multigraph

CUTTING COSTS IS OUR BUSINESS

Addressograph-Multigraph Corporation
Dept. B-7, 1200 Babbitt Road • Cleveland 17, Ohio

I am interested in the new Addressograph Data Punch and would like:

- ☐ A free demonstration at my office
- ☐ Descriptive bulletin showing models and prices

Name_____

Company_____ Title_____

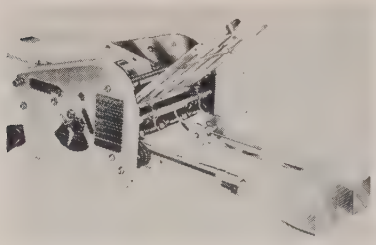
Address_____

City and State_____

For More Information Circle Reader Service Card No. 173

Business Automation Showcase

Folding Machine



A new model FH-5C, all electric, desktop folding machine has been announced by Print-O-Matic Co., Inc. It performs slitting, scoring and perforating operations with or without folding. The redesigned unit features a new snap-on first fold plate that simplifies the added operations without folding. Construction is sturdier, the motor more powerful and all popular folds can be performed. A variable speed control is optional. The FH-5C folds, stacks and conveys about 150 sheets per minute. It can handle up to six stapled sheets of 20-pound paper and may be used in conjunction with the company's Crossfolder to obtain right-angle folds in one operation. Circle No. 114

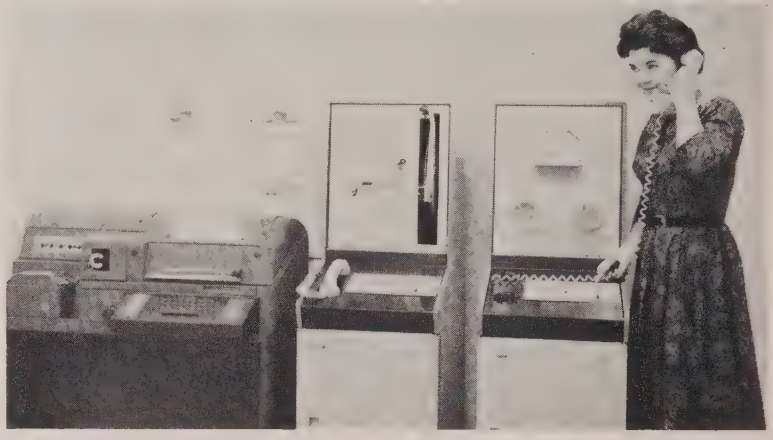
New Computer

A new computer equipped with a magnetic core memory of 8,192 12-bit computer words, buffered input and output, program interrupt, and a list of 91 instructions is announced by Control Data Corp. Control Data 160-A is packaged in an office desk, and the basic magnetic core memory can be expanded in modules up to 32,768 words. A variety of peripheral equipment can be added, including a magnetic tape system, high speed line printer, card reader/punch and electric typewriter. The Control Data 350 Paper Tape Reader and Teletype Paper Tape Punch are standard equipment. Circle No. 113

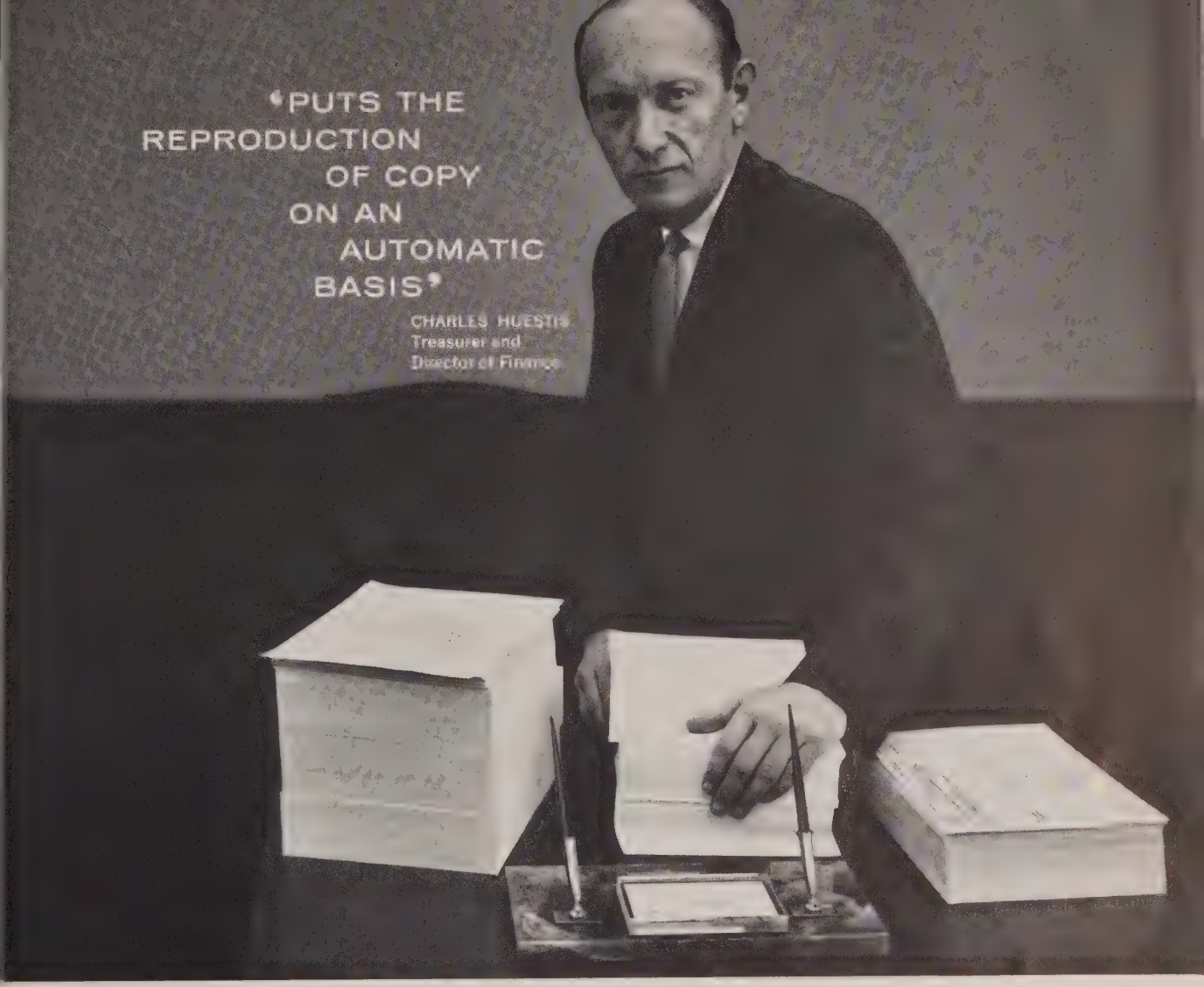
Photoelectric Keyboard

A photoelectric binary-encoding technique is used on a keyboard introduced by Invac Corp. The new K-144 alpha-numeric keyboard permits the generation of any standard or special five to eight-bit binary code while eliminating encoding matrices, contacts and switches. When a key is depressed, an associated binary-coded shutter modulates a bank of light data channels. The resultant binary-coded light data produces resistive changes in a bank of photoconductors corresponding to the binary code used. Optional amplifier circuitry converts signals to electric signals compatible with standard computer logic, used for on-line applications. K-144 with amplifier—$550. Circle No. 109

Dataspeed—Teletypewriter Tape Transmission System



A high-speed teletypewriter tape transmission system capable of transmitting and receiving more than 1,000 words per minute has been developed by the Bell Telephone System. Dataspeed will permit a 5,000-word teletype message from New York to Chicago to be sent via the regular telephone network in approximately five minutes. Consequently, line charges are nominal. Coupled with the Bell System Data-Phone Series 200, Dataspeed will enable customers to utilize the regular telephone network and dial their own connections. Initial installations are scheduled for the latter part of 1961. Dataspeed utilizes a standard five-level punched paper tape, which can be produced by any teletypewriter with a tape punch attachment. Tapes simultaneously produced by a teletypewriter can be transmitted by one Dataspeed machine at the rate of 750 bits or 1,050 words per minute. Other models of Dataspeed will handle up to eight-level tape and furnish error detection and automatic correction. Circle No. 106



Copyflo® 11 Printer saving Hughes $300,000 a year

A Copyflo 11 continuous printer is saving Hughes Aircraft Company more than $300,000 a year in the reproduction of engineering drawings, correspondence, reports, and administrative documents. Engineering prints, however, form the bulk of the copying work.

So fast is the Copyflo continuous printer in comparison to manual reproduction methods previously used that Charles Huestis, Hughes' treasurer, says, "It puts the reproduction of copy on an automatic basis."

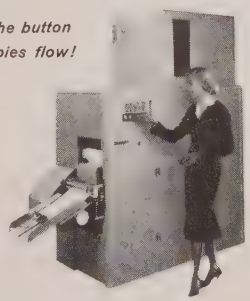
This is scarcely an overstatement. A Copyflo continuous printer automatically turns out a *different* 8½"x11" print every three seconds, an 11"x17" print every six seconds.

A Copyflo continuous printer automatically produces—at the rate of 20 linear feet a minute—dry, positive prints or offset paper masters, ready for immediate use. The machine operates on the principles of xerography—clean, fast, completely dry—copying anything written, printed, typed, or drawn.

Copyflo printers reproduce from original documents or from microfilm. They enlarge, reduce, or copy size to size, *and use ordinary paper.*

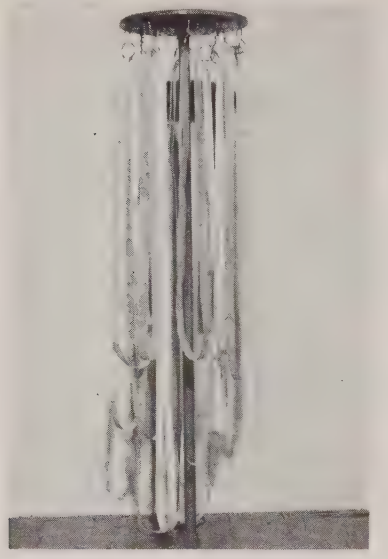
The volume of *your* daily copying may well justify a Copyflo continuous printer, too. Why not find out *now* how much you can expect to save in time, money, space, and materials? Let our trained systems and procedures man make a free analysis of your paperwork-duplicating needs. Write XEROX CORPORATION (formerly Haloid Xerox Inc.), 61-180X Haloid St., Rochester 3, N.Y. Branch offices: principal U.S. and Canadian cities. *Overseas:* Rank-Xerox Ltd., London.

push the button and copies flow!



XEROX
CORPORATION

Storage and Feed Rack

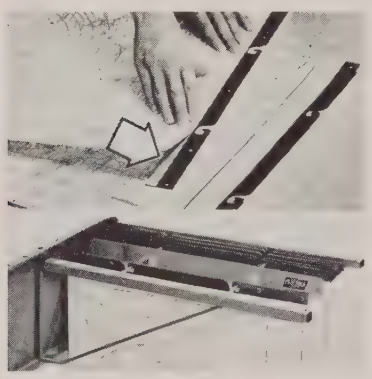


Tape loops may be stored safely and kept immediately available for use on new Loop Storage and Feed Rack by Dresser Products, Inc. Any number of tapes may be held on 16 hangers. Unit rotates on a turntable so any desired loop can be positioned with a touch of the fingers. The entire rack is mounted on ball casters and may be rolled into position. An outrigger attachment may be added for especially long tapes. The entire rack stands 50-in. high and 15-in. in diameter. Short tapes are removed for processing. Circle No. 110

General Purpose Input and Recording Stations

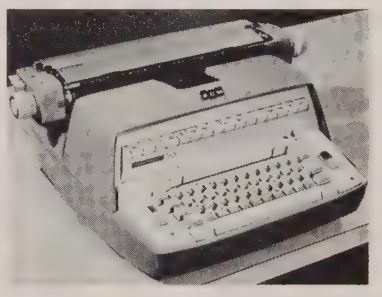
A new company, Datex Corp., has introduced three new data systems. The Model 87-210-01 general purpose input station (shown above) will receive card, badge, variable, fixed and remote data. It will transmit the inserted data to a DL-210 central recording station, where all data will be recorded in computer-compatible language on punched paper tape. The input station includes a reader capable of receiving up to 80 digits of pre-punched card data and 10 digits of pre-punched badge data. Each data transmission received by the recorder will be documented with time and data at a rate of 60 characters per second. Both units are provided with error checks. Another unit is the Datex DL-209 Data Acquisition System for quality control test recording. It consists of an input (test) station and a central recording station. As each production component is placed in the test fixture and its associated identification card inserted in a card reader, the test is automatically conducted and the component and operator identification, test description and test results are transmitted to a central recording station, where all data is recorded on a single punched card at approximately 130 characters per second. Circle No. 103

Vertical Files



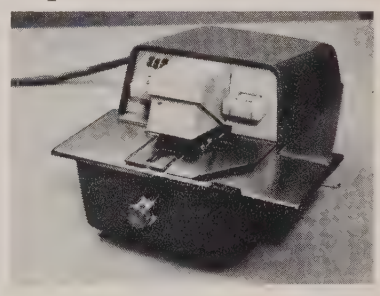
Plan Hold self-adhesive sheet hangers (method shown above) for vertical filing of blueprints, maps, plans and tracings have been improved by the addition of a clip-on plastic window for each binder to hold and protect an index card. Circle No. 120

Heavy-Duty Typewriter



Key product in a new line of components being offered by Smith-Corona Marchant, Inc., Data Processing and Technical Sales Div., to manufacturers and users of data processing equipment, is a heavy-duty electric typewriter. The unit serves as an input-output device for electronic systems and has several special features. Circle No. 107

Tape Reader



Typetronic reader is one in a line of components being offered to the data processing industry. The unit will read five to eight-channel punched paper tape or edge-punched cards photoelectrically. This can be done at a rate of 30 characters per second. The reader will handle oiled or unoiled tape and standard colored tape. Circle No. 108

JOHNSON'S WAX

"WORLD'S LARGEST MANUFACTURER OF WAX POLISHES"

"*National** 304 Data Processing System has proved to be a highly profitable investment!"

—S. C. JOHNSON & SON, INC., *Racine, Wisconsin*

"The National 304 enables us to know *today* where we are *today*. For example, we can now bill customers on the same day items are shipped from warehouses anywhere in the United States. This has enabled us to pick up working capital equivalent to three days' sales—an important saving.

"We can now take action *today* on inventory requirements based on last night's actual inventory and unfilled orders position. As an initial result, we have reduced finished inventories by 10%, with the potential of greater reductions in the near future.

"Our manufacturing and production scheduling are now more closely coordinated with sales needs than ever before. And, our field warehouses are stocked more intelligently, enabling us to serve our customers better.

"Fundamentally, the National 304 has given us faster and more accurate control over sales efforts, production, inventory, credit, and customer billing. It has sharpened management reflexes, enabled us to harness data in time to be used most profitably, and meets our demands for the factual data necessary to make management decisions in time to be most effective.

"At this stage of our installation progress it is difficult to assign a definite money value to all these advantages. However, we know their value represents a highly profitable return on our investment."

Howard M. Parkard

President
S. C. Johnson & Son, Inc.

* TRADEMARK REG. U.S. PAT. OFF.

*National**

ELECTRONIC DATA PROCESSING
ADDING MACHINES • CASH REGISTERS
ACCOUNTING MACHINES • NCR PAPER

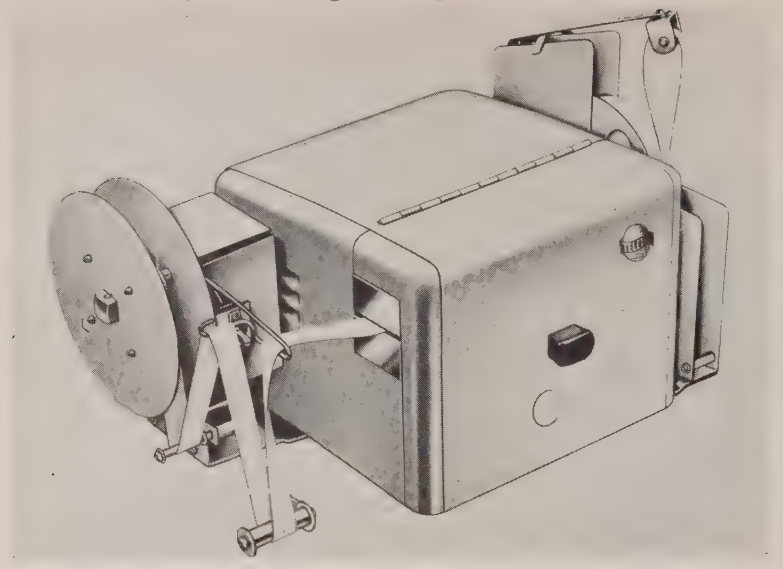
"Leading manufacturer of wax polishes and other fine products for home, industry and agriculture."

THE NATIONAL CASH REGISTER COMPANY, Dayton 9, Ohio

1039 OFFICES IN 121 COUNTRIES • 77 YEARS OF HELPING BUSINESS SAVE MONEY

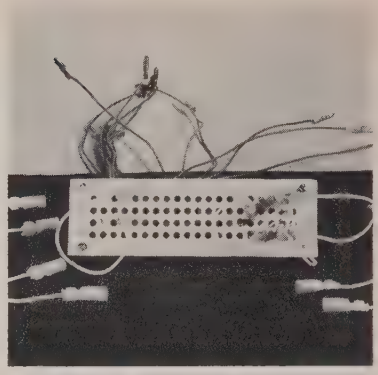
For More Information Circle Reader Service Card No. 175

Parallel-Wire, Multi-Magnet Tape Punch



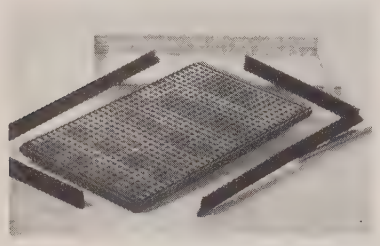
A new multi-magnet tape punch, designed to receive parallel-wire input from message communications equipment, has been developed by Teletype Corp. The Model 28 LARP is an off-line tape punch which will serve as a slave unit in a wide range of data and message communications systems. Electromechanically operated, it provides programmed storage in fully-perforated tape. In data collection systems, LARP records information gathered from many sources into one "combination" master tape. Used in communications systems, the tape simplifies data relay. Attached to business machines (i.e., calculators, adding machines, electric typewriters, cash registers), the unit produces a record by-product tape. Circle No. 105

Piggy-Back



A new self-contacting Piggy-Back for EAM and data processing machines has been added to the accessory line of Tech Panel Co. The unit can be installed on any self-contacting control panel cover. It makes up to 80 hubs available for external machine function changes. Using the new Tech-Piggy-Back, pilot selector pickups, co-selector pickups, comparing entries, program starts, spacing, counter entries and other machine functions may be made efficiently. Panel covers do not have to be removed to trace wire changes. Piggy-Backs may be mounted vertically or horizontally. Circle No. 111

Panel Accessories



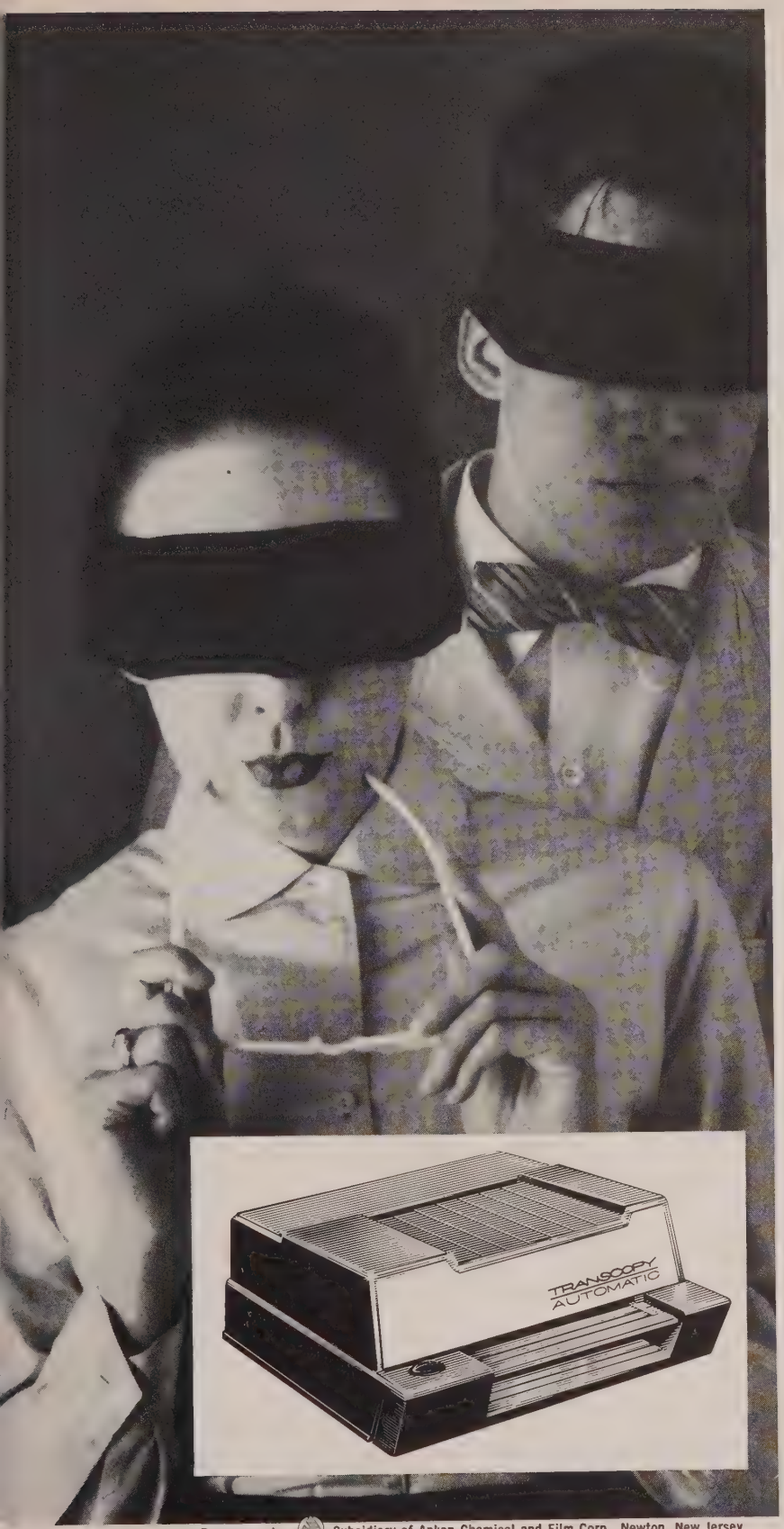
Two new accessories for data processing machines—a special control panel and a panel conversion kit (shown above) — have been announced by International Business Machines Corp. The Type 905 single-section control panel may be used to replace jack-type panels. Consisting of a molded plastic insert, the conversion kit allows a Type 901 jack-type panel to be changed into a 905 self-contacting panel at customer location. Other accessories and supplies recently announced by IBM include paper checks imprinted with magnetic ink for automatic handling and H-D (Heavy Duty) magnetic tape. Circle No. 115

EDP Ribbons

Inked ribbons for use on high-speed printing units such as IBM 1403's, Remington Rand Univacs and RCA 501's, have been introduced by F. S. Webster Co. Computer ribbons are available in black, blue and purple, with formulas adapted for either straight record work or offset plate systems. Webster LithoType formula is suitable for offset work. Another development is the Multi-Kopy WebTex ¾-in. IBM tabulating ribbon for Models 402 and 407. Circle No. 104

Ferrite Core Memory

A new, high-speed, large-capacity memory unit has been announced by Ampex Computer Products Co. Model RQL is a ferrite core memory, available in a wide range of word capacities: 1024, 4096, 8192, 16,384 and 32,768. All sizes can be obtained in eight to 60-bit word lengths. Circle No. 112



SO NEW You MUsT use a bliNDFoLD

That way you'll really know what *automatic* means! Blindfolded, slip a single sheet of paper (memo, chart, drawing, photo — *anything, any color*) into the machine. What happens never happened before in office photocopying. The machine does everything. Activates itself. Supplies the photocopy paper. Exposes the original. Prints a copy. Trims it to exact size. Unbelievable! From start to finish — completely automatically — in much less time than it took you to put the blindfold on, slip the paper in, take the blindfold off!

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AUTOMATIC

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TRANSCOPY, INC.
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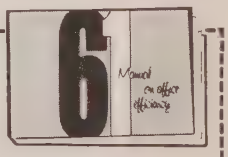
10 Paterson Ave., Newton, N. J.



Gentlemen:
I'd like to know all about your new Transcopy Automatic.

☐ Rush me the cost-saving "'61 Manual on Office Efficiency."

☐ I'd like to see the Transcopy Automatic in my office. Have your representative phone for appointment.

Name _____

Title _____ Phone _____

Company _____

Address _____

City _____ State _____

Transcopy, Inc. Subsidiary of Anken Chemical and Film Corp., Newton, New Jersey

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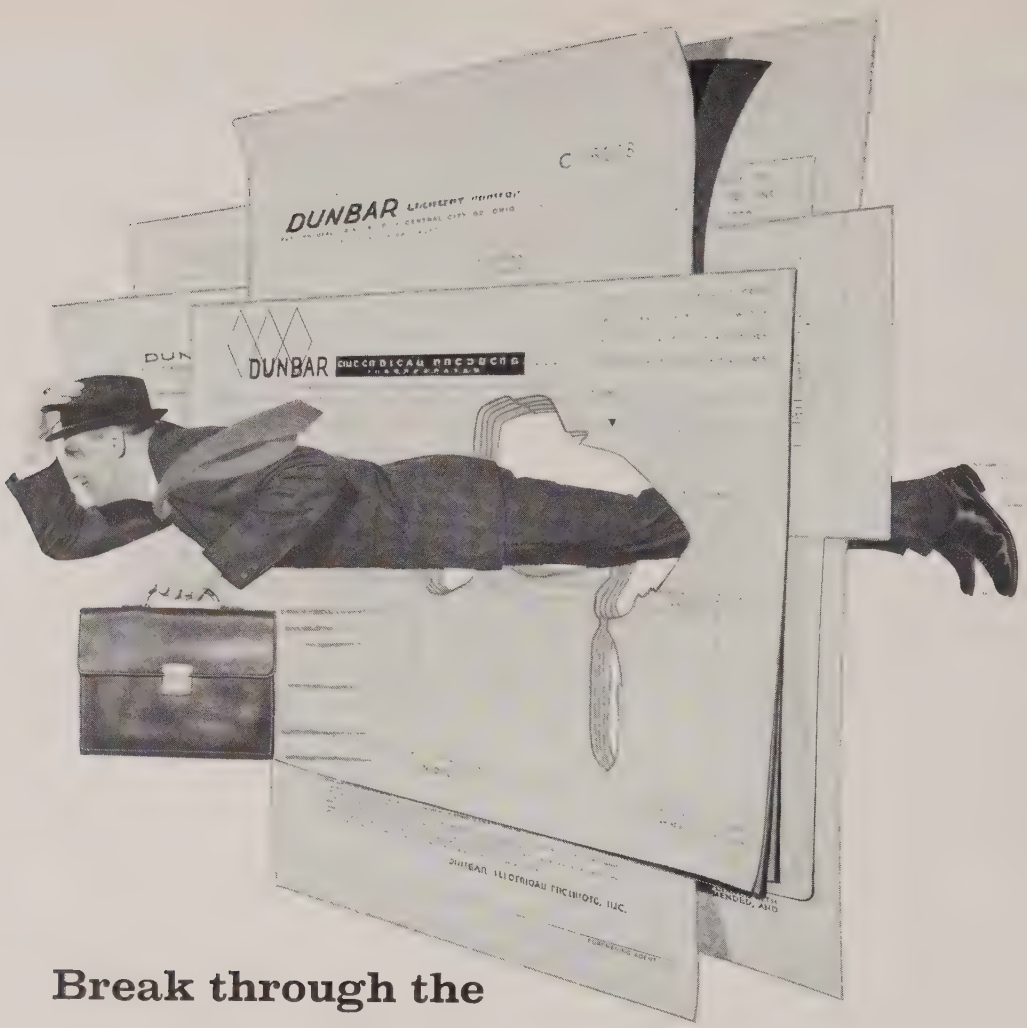

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Weary of complicated, time-consuming and profit-robbing paper work? Call a business forms expert, a Reynolds & Reynolds Representative. Let him show you how to eliminate deadwood paper work . . . simplify existing forms . . . design and coordinate new forms into an efficient, integrated system that will cut your overhead.

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Copies On Request

EDP—The First Ten Years—Four brief non-technical articles are presented by McKinsey and Co., Inc. to help management make EDP a major profit-building tool. Circle No. 130

Duplicator Profits—Two new booklets have been released by Ditto, Inc., one concerning direct process duplicating and the other offset duplicating. Circle No. 131

Nylon Post Binders—This "pocket catalog" tells how to house voluminous records tabulated on marginal-punched forms by various EDP machines on nylon post binders of Wilson Jones Co. Circle No. 132

Airtube Catalog—A 40-page products catalog includes an introduction that deals with the problems of paper handling itself, describes, in detail, products of Lamson Corp. Circle No. 133

Source Data Collection—The portable Addressograph Data Punch is described in a folder from Addressograph-Multigraph Corp. Circle No. 134

Stock Business Forms — A complete list of forms and their uses in a 72-page book is available from Stock Forms Co. Circle No. 135

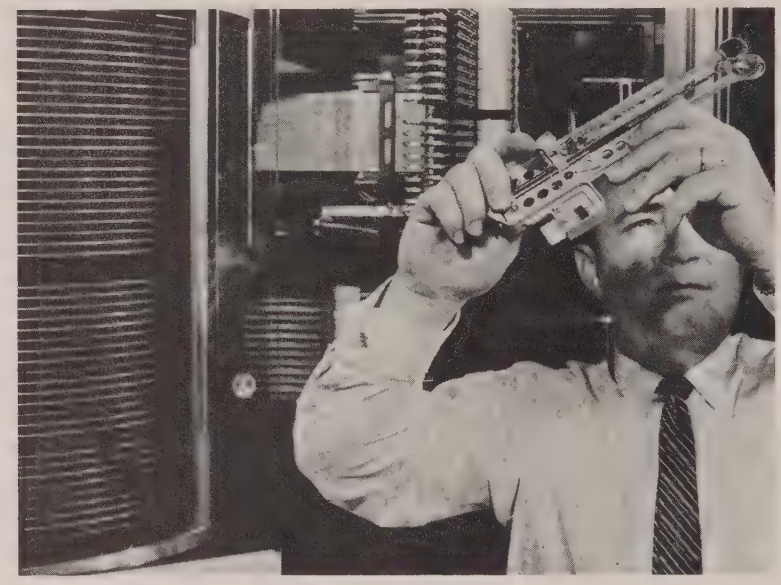
Consultant Story—"Helping Business Help Itself" is the title of a 12-page booklet telling the management consultant's story by tracing the history of the profession. From Profit Counselors, Inc. Circle No. 136

Before Installing — A five-page booklet has been put out by Philco Corp. describing what to do before installing a computer system. Circle No. 137

Automatic Labeling—Literature describing labeling applications of the Cheshire, Inc., rotary head Model E is available from the firm. Circle No. 138

NEWS

Storage Disk Improves Computer Memory



From IBM's 1301 disk storage unit (background), an engineer examines an access arm containing, at its tip, a pair of read/write heads.

Comb-like arms capable of monitoring up to 280 million characters of data in an information storage system can increase the scope of many computers and reduce re-programming time.

The arms are a part of IBM's new 1301 disk storage unit, which consists of a file containing one or two modules (or stacks) of 20 rapidly-revolving data storage disks each. For each disk surface, there is a read/write head mounted at the end of the comb-like access arms and aligned in a vertical cylinder.

All of the programs for an IBM 7090 can be stored on a 1301 unit. Instead of the usual several minutes required to set up a 7090 for a two or three-minute processing job, the 1301 can rush another program into the computer in seconds.

For use with the IBM 1410, 7070, 7074, 7080 and 7090 computers, the unit also may be shared by any two of them. Sharing the same 1301 file, the scientific 7090 and commercial 7080 can have reference to a wide range of both scientific and commercial programs.

"The 1301's vast capacity and very high access speeds open the way to total systems processing," says Warren Hume, new president of the IBM Data Processing Div. "This means that the vital records of most businesses can be maintained at a single, convenient location and can provide anyone within the company—at home or at a branch office — almost immediate access to all pertinent data."

Shipments will begin in the third quarter of 1962.

Spiegel Pays $1.5 Million For 200 Business Machines

Spiegel, Inc., Chicago, one of the nation's largest mail order houses, has placed an order with Ferranti-Packard Electric Ltd. for 200 automatic order-writing machines. The machines will be used in a system to automate inventory control of 120,000 stockkeeping units in the Spiegel catalogs.

According to M. J. Spiegel, chairman, the initial installation will cost approximately $1.5 million and additional machines will be ordered as soon as the initial equipment is coordinated with the operating activities of the plant.

New NCR Marketing Plan Provides More Local Reps

EDP training for 950 company representatives is included in a major expansion of National Cash Register's marketing facilities recently announced by Robert Oelman, president. The program will provide the company with local representation in 60 major American cities by the end of the year, Oelman said.

Designed to provide coast-to-coast coverage of business, industry and government in the marketing of NCR's 304 and 315 EDP systems, the program creates regional offices in New York, Chicago, Los Angeles, Philadelphia, Dallas, Atlanta, Hartford and Dayton.

Offer Short Course in OR

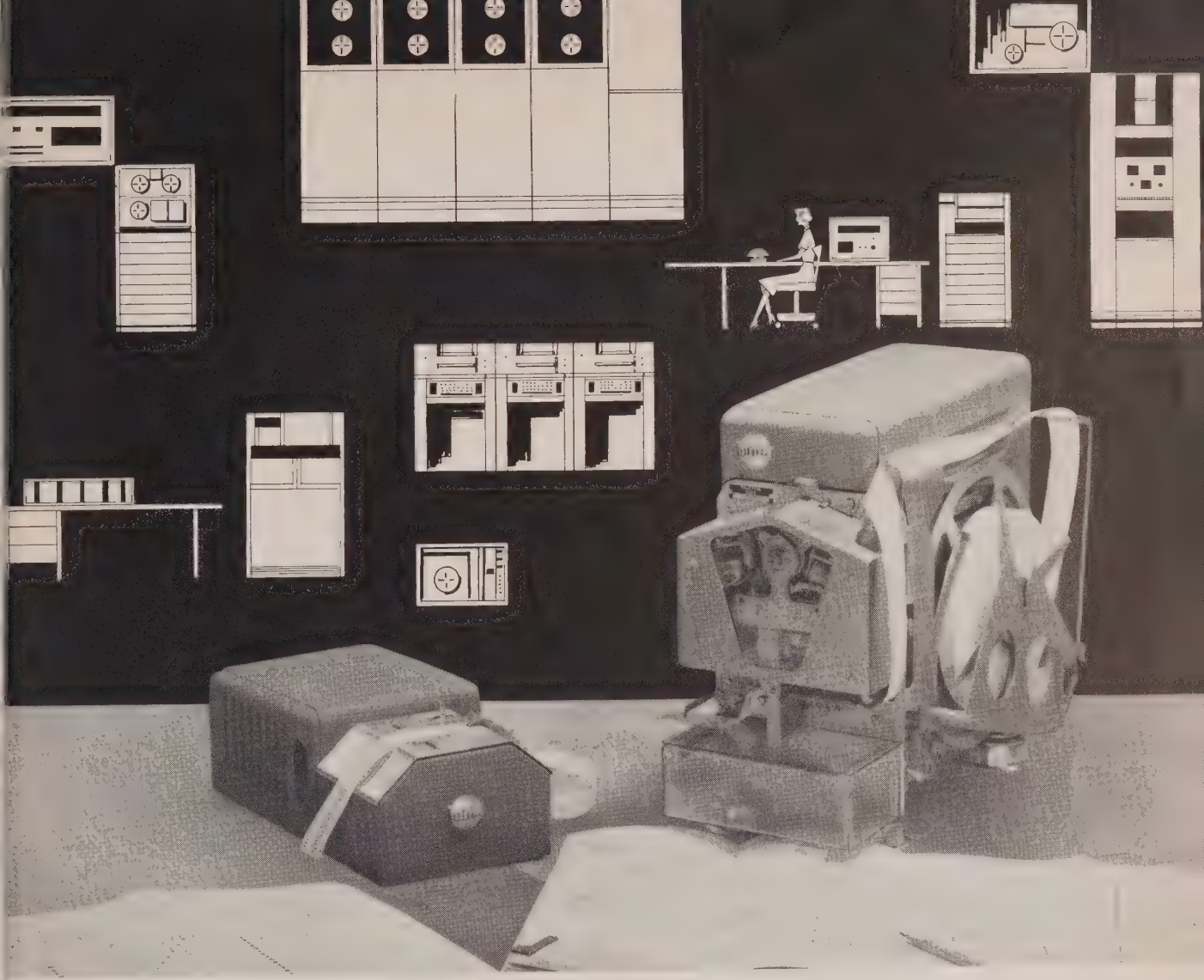
Four two-week courses in Operations Research will be offered to engineers, managers and scientists attending the University of Michigan Summer Engineering Conferences, July 10-21, in Ann Arbor.

To be covered in the courses: "Foundations and Tools for Operations Research and the Management Sciences," "Recent Mathematical Advances in Operations Research," "Modeling and Simulation in Operations Research," and "Advanced Data Processing Techniques."

IBM, Two Other Firms Join in Marketing Pact

IBM, Allis-Chalmers and Consolidated Systems have entered into an agreement whereby all three "will work together in the engineering and marketing of automated control systems when a customer wishes to have a coordinated system."

This means that, under the pact, a typical system might include IBM data processing equipment, Allis-Chalmers industrial equipment, and Consolidated's special mechanical, electro-mechanical and optical instrumentation.



New Teletype 1000-speed tape units

Here are two new units that offer the advantages of punched paper tape at 1000 words per minute—and combine traditional Teletype dependability with design simplicity and relatively low cost. Used together, the CX reader (left) and BRPE punch (right) are ideal for tape-to-tape communication of bulk message or statistical traffic via the new Data-Phone service. The reader and punch may also be used individually for communicating data to or from computers, and other devices associated with data processing, telemetering and similar communications functions.

These high-speed units operate on a parallel-wire signal path, in either transistorized or vacuum tube circuits. For serial transmission over conventional voice channels, signals can be converted by external facilities. A pulse generator, adjustable through a full 360 degrees, triggers the external signal storage and provides optimum synchronization of intelligence transfer.

Tape Reader—Will read chadless or fully perforated tape, in $^{11}/_{16}$″, $^{7}/_{8}$″ or 1″ tape widths. Includes a set of auxiliary timing contacts that operate simultaneously with the sensing pins and assure accurate synchronization with associated transmitting equipment. Dimensions: 5″ high, 6″ wide, 11″ deep. Models available for reading 5, 6, 7, or 8 level codes.

Tape Punch—Produces fully perforated tape. Equipped with "low tape" warning mechanism which can be wired to external alarms. Tape container designed for easy access. Dimensions: 12″ high, 8″ wide, 16½″ deep. Available in two models—one for punching standard 5-level communications code ($^{11}/_{16}$″ tape); the other adjustable for punching 6, 7 or 8 level codes ($^{7}/_{8}$″ or 1″ tape).

Teletype Corporation manufactures this equipment for the Bell System and others who require the utmost reliability from their data communications facilities. For free descriptive literature on the CX and BRPE units, write Teletype Corporation, Dept. 17G, 5555 Touhy Avenue, Skokie, Illinois.

TELETYPE®

For More Information Circle Reader Service Card No. 178

Williams, Jones, Hume Get New Posts at IBM

Thomas J. Watson, Jr., newly-appointed chairman of the board at IBM, has been succeeded to the presidency of that company by Albert J. Williams. Williams was

Williams

Hume

formerly the executive vice president of IBM.

Named to the post of assistant to the president is Gilbert E. Jones, former president of the Data Processing Div. Jones has been succeeded in that position by Warren C. Hume, formerly the division's general manager.

'Phone Booth' Facsimile Proposed to Post Office

In spite of recent reversals (see BUSINESS AUTOMATION, Apr. 1961, p. 36), post office automation continues a distinct possibility.

John M. Alden, president of Alden Electronic & Impulse Recording Equipment Co., recently presented the Post Office-Treasury Sub-Committee, Senate Appropriations Committee, with a plan for "Next-Hour" delivery of high-priority mail via facsimile.

Proposing to pay the Post Office Dept. for a franchise to install high-speed facsimile stations (which would resemble telephone booths) in local post offices, Alden would concentrate on top-priority mail that now is being sent by special courier. Such mail is estimated at one percent of the total volume.

In no way similar to the "Speed Mail" facsimile system developed for the Post Office by International Telephone & Telegraph Co., Alden's equipment (which ultimately would cost the company some $30 million) would produce estimated revenues of $1 million the first year and up to $10 million in subsequent years for the government.

New Computer Group is Formed at WJCC

An important new organization, the American Federation of Information Processing Societies, was formed at the recent Western Joint Computer Conference, held May 9-11 at the Ambassador Hotel, Los Angeles.

The AFIPS will supplant the National Joint Computer Committee and will take over the administration of the WJCC and the EJCC. It was founded by the member organizations of the NJCC: the American Institute of Electrical Engineers, the Assn. for Computing Machinery, and the Institute of Radio Engineers. Four men from each of these organizations will serve as the governing board of the AFIPS and Dr. Willis Ware, the RAND Corp., will be the group's first chairman.

The largest computer gathering ever held, the WJCC played host to over 3,500 registrants. Over $3 million worth of equipment was exhibited in more than 100 display booths.

Keynote speaker was Thomas Watson, Jr., chairman of the board at IBM, who stressed the importance of the acceleration and acceptance of technological change as a vital means of offsetting unemployment.

Dr. Simon Ramo, executive vice president of Thompson Ramo Wooldridge, another principal speaker, said that human, political and organizational problems are a bigger barrier to progress than technological ones. The control and reduction of these problems, he said, is the most important role of artificial intelligence.

Other show highlights:

On view for the first time were the desk-size Autonetics Recomp III and the CDC 160-A.

Tally Register Corp. announced its new Transdata system.

For the first time, Burroughs showed its B-442 tape unit, part of its newly-announced B-5000 system.

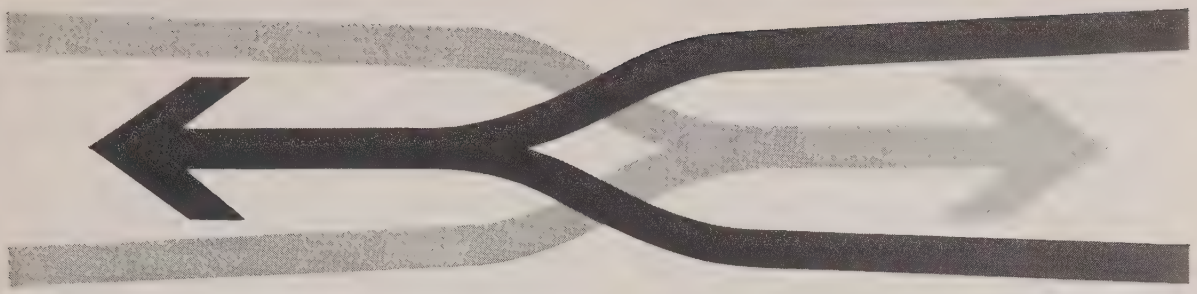
New Dashew Databosser Embosses, Punches Plates

The world's first machine capable of simultaneously embossing and code-punching plastic or metal plates has been announced by Dashew Business Machines.

The Electronic Databosser will process up to 3,600 plates an hour, acting on instructions from punched cards, punched or magnetic tapes.

The machine will punch either binary or decimal codes and input can be Hollerith code or any binary code configuration.

"I think it's gone batty!"



What can Bell System DATA-PHONE do for your business?

If you use data-processing equipment, and have more than one business address, you'll like what you read here

What is Data-Phone? It's a new Bell System service that lets business machines "talk" together over regular telephone lines.

How does it work? You connect Data-Phone with business machines at your headquarters and at outlying plants or offices. You place a phone call from one point to the other, turn on Data-Phone, and the machines "talk" data at speeds up to 1200 "bits" per second.

What does it cost? You pay a small monthly rental for Data-Phone, then pay for each Data-Phone call just as you do for regular phone calls.

What can it do for you? It can help you collect sales reports, inventories and production figures every day, or every hour, if you wish. It can help you control shipments, collect payroll figures and expedite all sorts of administrative, accounting, purchasing, credit and merchandising functions.

Data-Phone can cut clerical time and expense for you, reduce errors, speed customer service and get you vital information *when you need it* for management decisions. It's doing it for many firms already.

Data-Phone is just one of many new Bell System services which can help your company operate more efficiently and profitably. To get full details, just call your Bell Telephone Business Office and ask for a Communications Consultant—or mail the coupon. No obligation, of course.

American Telephone & Telegraph Company
Data-Phone Division, Room 513A, Dept. E
195 Broadway, New York 7, N. Y.

Please have a Communications Consultant contact me regarding your new Data-Phone service.

Name_____

Firm _____

Address_____ Phone_____

City_____ State_____

BELL TELEPHONE SYSTEM

THE ONE SOURCE FOR ALL BUSINESS COMMUNICATIONS

AutoPromt Directs Milling Machines in 3-D

Numerically-controlled machine tool (background) shapes a complex helicopter gearbox cover (wheel-like object), acting on over 8,000 detailed instructions from computer. Under control of AutoPromt master program tape (foreground), the computer acted on 180 statements in English-like language.

Plant automation through the use of numerically-controlled machine tools has been broadened with the development of a new computer language, IBM's AutoPromt.

Written for IBM 704, 709 and 7090 computers, AutoPromt employs a vocabulary of 110 words. A part-programmer can use this vocabulary to describe, in familiar shop terminology, the surfaces to be milled, rather than each path the tool must follow in machining the part.

Describing each geometric surface to be machined, the programmer defines the relationships of these surfaces to each other and specifies the machining requirements, such as tolerances and tool sizes. Handwritten on an AutoPromt coding sheet, the part description is punched into cards, which are fed into the computer. The computer, under control of the AutoPromt master program, automatically generates the tool travel instructions for each surface to be machined, recording them on magnetic tape, perforated tape or other appropriate media for input into the machine director which will control the numerically-operated machine tool.

Wide application of AutoPromt is anticipated throughout the aircraft, missile and automotive manufacturing and metalworking fields. Designers no longer will have to compromise their efforts in order to avoid expensive hand-tooling or loss of tolerance. Automation of short-run production is made possible. Lead time can be reduced considerably.

NCR Announces System For Large Savings Banks

A new electronic system that automatically will handle record-keeping at large savings banks has been announced by National Cash Register Co.

When a customer makes a deposit or withdrawal, the NCR Class 42 window machine flashes the information to the NCR 315 computer. In less than a second, the computer enters the amount, figures the new balance and transmits the information back to the teller. The window machine automatically prints the data in the customer's passbook.

Branches in different areas will transmit their data by leased telephone wire.

The on-line system is capable of processing 12,000 savings transactions an hour.

Data Transmission System Converts To Tape

The nation's first coast-to-coast industrial data transmission system has been converted from punched card to magnetic tape.

Installation of a Kinetape magnetic tape transmission system by Collins Radio Co. has given Douglas Aircraft Co. a 2,200-mile high-speed link between its missile plant in Charlotte, N. C., and its computer center in Culver City, Calif.

Tape handles technical data from the Charlotte Nike Plant to California for computation faster than cards.

next month . . .

Tom New of Westinghouse

First in a series of profiles on outstanding personalities in the field of business automation.

also . . .

A Man-Machine Approach to Sales Forecasting. An analysis of the role management must play in forecasting, plus a yardstick for you to use in determining the helpfulness of computers.

For men of vision

SOLID CAREER OPPORTUNITIES IN BURROUGHS ELECTRONIC DATA PROCESSING MARKETING

Waiting for you at Burroughs Corporation are some of the industry's most challenging and rewarding career opportunities. An extensive and purposeful research and development program has spurred the introduction of several major systems this year—including the pace setting new B 5000, the first computer specifically designed to implement problem oriented languages. There are more to come. A planned program of future releases will insure continuing growth opportunities. Substantial opportunities now await qualified personnel in the following positions:

Special computer representatives: To promote the sale of this advanced data processing equipment, working with experienced account representatives. Opportunities to advance are wide open because of Burroughs practice of developing management personnel from within. Salary plus override will be attractive to experienced computer sales representatives.

Sales technical representatives: To assist sales representatives in technical aspects of sales presentations and guide installations of systems. You will receive progressively more challenging assignments in either scientific or business data processing. You'll qualify with strong magnetic tape installation experience or sound punch card systems background, and receive a salary commensurate with experience.

Openings are available in major cities thoughout the U.S. Call the manager of our office near you, or write in confidence to L. D. Staubach, Director of Marketing Placement, Burroughs Corporation, Detroit 32, Michigan.

Burroughs—TM

Burroughs Corporation

All qualified applicants will receive consideration for employment without regard to race, creed, color or national origin.

For More Information Circle Reader Service Card No. 181

Don't Bet on Business Games

Continued from Page 25

management has to face; in particular, personnel, psychological and organizational problems have not yet been introduced in these games to anything like the degree to which the more analytical kinds of problems in marketing, finance and production have been incorporated."

Cohen and Rhenman warn that the problems of information gathering are not adequately handled in many games, giving the participant the misconception that information comes freely and easily from computers. They often fail to realize how difficult it is to obtain this information in the business world.

The authors suggest that future games be constructed with "free" or "non-structured" elements. These might include labor costs and productivity, union problems, effects of public relations and advertising, patterns of business cycles, realistic decision intervals, sensitive environment, human relations problems and research and development treated in a more realistic light.

Success is suspect

What Cohen and Rhenman propose is a "business game case," utilizing a computer, in which the classical business case used in universities is patterned after an actual business and operates with as many variables as possible.[3]

A serious consideration of the role which business games play in management was made at the first National Simulation Forum sponsored by the AMA and held at Saranac Lake, N. Y., in May, 1960. The tone of the discussion was often pessimistic.

Jack D. Steele, director of the executive development program at the School of Business, University of Kansas, said: "It is my feeling that the value of simulation as a management decision-making tool has been demonstrated and accepted to a much greater extent than has the value of management games." Steele related some unsatisfactory experiences he had in using games in education, and he concluded: "I submit that, in terms other than the mere number of games developed or in use, success of simulation (in games) is unproved and, in fact, highly suspect."

Absurdly simple world

Near the end of the panel discussion, Dr. Carl F. Kossack, research manager of statistics and operations at the IBM Research Center, summed up the conference by saying: "I've been listening to the various speakers at this forum and I've been surprised to find that no one has yet mentioned any specific objectives for using games. How can you tell whether something is effective unless you know exactly what you're trying to do with it? Gaming doesn't teach business decision-making at all, except in the most rudimentary sense. Even the most complex game models are absurdly simple in comparison with the real world of business."[4]

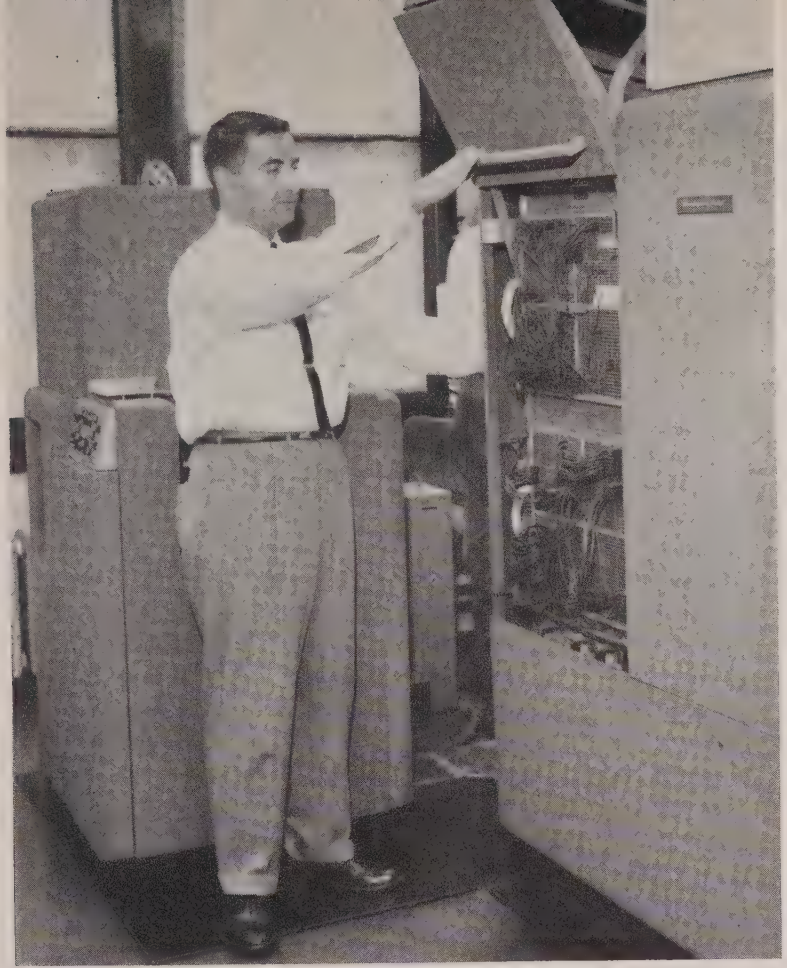
Peek into the future

Obviously, by virtue of the investment in their existence, business games will continue in popularity. But they are a poor bet for management that is looking for more than computer indoctrination on the most elementary level.

The games technique itself will not provide management with a crystal ball. On the other hand, pure simulation, as a long term investment in time, money and proper personnel, is a good bet for the executive who wants to take a scientific peek into the future of his business. Games are for fun; simulation is for real. ■

3. Cohen, K. J. and Rhenman, E., Carnegie Institute of Technology and The Business Research Institute of the Stockholm School of Economics. "The Role of Management Games in Education and Research." Management Science, Vol. 7, No. 2, Jan. 1961.

4. "Simulation and Gaming: A Symposium," Albert Newgarden, editor, published by General Management Div., American Management Association, Inc. New York, N. Y., 1961, pp. 27-37 and pp. 38-59.



The first Univac 60 to be delivered in the Chicago area (1955) is used by Youngstown for employe records, production, inventory and cost accounting.

Warehouse of Cards

Continued from Page 40

a hooker wants to add a new supply to his stock, all he has to do is check with the printed warehouse report to find where that type of tin plate is being stored, then compare the report with the identification tags.

Still another notable saving is in the time required to release a given shipment which is being held on location for a customer. Some larger Youngstown customers maintain a backlog of two or three months' supply in the warehouse, calling for parts of this stock as needed.

Youngstown employs 27,000 people, primarily in the Youngstown, Ohio, and Chicago districts. The company's output of products ranges from railroad spikes and steel pipe for the nation's oil and gas transportation lines to sheet steel for automobiles.

Youngstown has set up a unique employe indoctrination program. Each operation in the tab department is thoroughly spelled out in a control book, which is a profusely-illustrated, step-by-step set of instructions on how to run that particular operation. These control books are part of a work-simplification program which began several years ago and which will take another year or two to complete.

The instruction books are expected to be especially useful in setting up a new tab division in a new company department. An example is the Buttweld Department, which produces continuous buttweld pipe from one-half inch to 4-in. in diameter at two mills. Equipment in this department includes two sorters, an interpreter, a robot, two keypunches, and one eight-channel tape-to-card converter.

Using the control books, the tab supervisor has found that training time for the personnel who will be operating this new division will be reduced substantially. ■

Business Calendar

July 5-7 — Seminar, designed specifically as an introductory course to data processing, is offered at no charge by Philco Corp.'s Computer Div., 3900 Welsh Rd., Willow Grove, Pa. For enrollment, write: C. A. Leventhal, manager of customer education, Philco Computer Div.

August 22-25—Western Electronic Show and Convention, sponsored by the Institute of Radio Engineers and the Western Electronic Manufacturers Assn. will be held at the Cow Palace in San Francisco. More information may be obtained by writing: WESCON Business Office, 1435 S. LaCienega Blvd., Los Angeles.

September 5-8—Sixteenth National Conference of the Assn. for Computing Machinery and First Data Processing Exhibit, Statler-Hilton Hotel, Los Angeles. Contact: Benjamin F. Hardy Jr., Gen. Chairman, Litton Systems, 550 Canoga Ave., Woodland Hills, Calif.

September 11-13 — National Convention of the Assn. for Bank Audit, Control and Operation, Conrad Hilton Hotel, Chicago. Write: Jack Craddock, Dir. Public Relations, NABAC, 38 S. Dearborn St., Chicago 3.

September 28-29 — Fourth Annual National Conference and Technical Exhibit of the American Production and Inventory and Control Society, Pick-Congress Hotel, Chicago. National Headquarters: 330 S. Wells St., Chicago 6.

October 8-11—International Systems Meeting of the Systems and Procedures will be held in Cleveland, Ohio, at the Statler-Hilton and Pick-Carter Hotels. The 14th annual meeting's theme is "The Systems Field—A Management Transition." For more information: Lawrence E. Melick, Secretary, 1961 ISM, c/o Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, Ohio.

BUSINESS AUTOMATION Editorial Index January-June 1961

1960 BUSINESS AUTOMATION Volume 5 Index by Application

ADVERTISERS' INDEX – JULY, 1961

EDITORIAL

The Game Bit

It used to be that, when a busy executive took time out for a game, one could assume that either golf or baseball was involved. Today, a third possibility—business games—is a more likely attraction. The business game technique, as our colleague points out in other pages of this issue (p. 22), is not and was not intended to be a sporting proposition. The hoopla and promotional gimmicks that often are associated with the game technique, have done much to create the competitive atmosphere which surrounds many games today, however.

Along with a group of fellow editors, we recently had an opportunity to "play the game." After a few bad guesses and several runs on the computer, our "widget" company was so far in the hole that even the "miracles" of electronics could not revive it. One of our more enterprising playmates suggested that the company apply for a disaster loan, but unfortunately we found out that the game has not yet been programmed for governmental assistance. So the widget company bit the dust and the board of directors retired to the bar, which was about the only business realism encountered in the whole game.

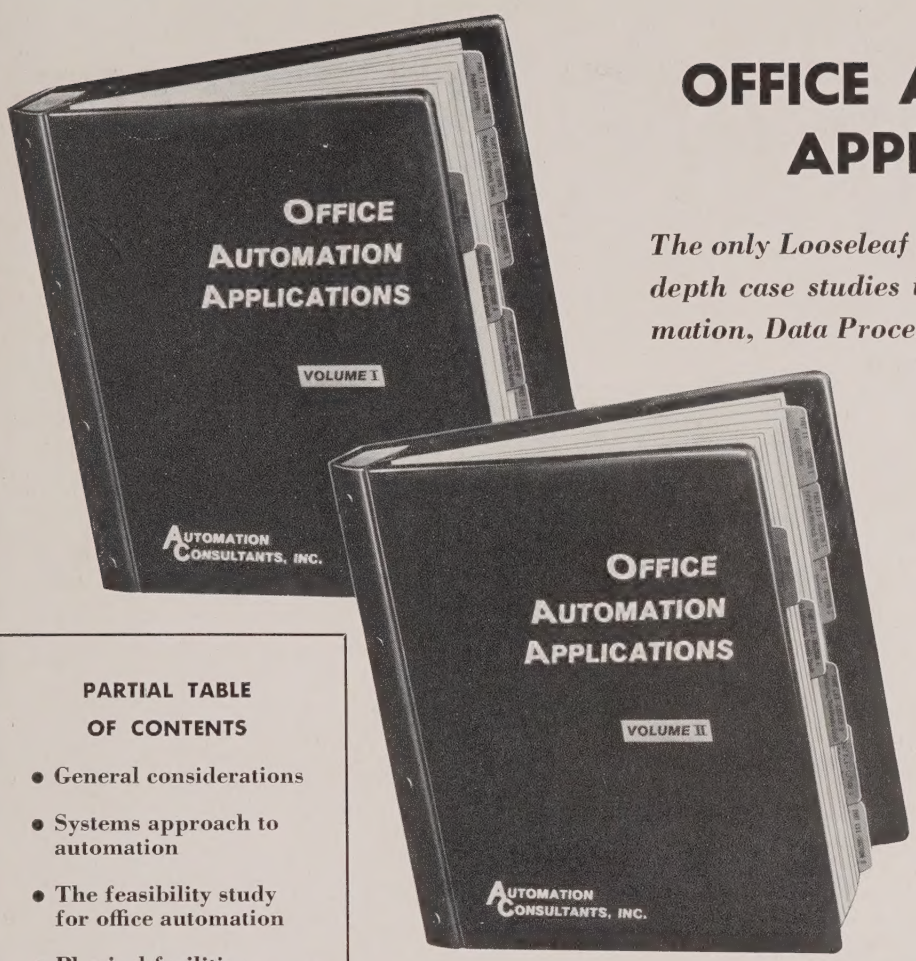
The real purpose of the game theory is to introduce business executives to the tremendous potential of scientific management. There can be no quarrel with this purpose, but we wonder if the "game bit" isn't overshadowing the intent of the gamesmakers.

Simulation, for example, hardly deserves to be called a game. Using the simulation technique, many firms have successfully turned over management operations to a computer with amazing financial benefits. This has been done in the areas of inventory control, production control and sales forecasting, with other operations in the experimental stage or on the way.

Our point is that the whole concept of scientific management is too important, too vital, to the future of American business to be casually labeled or played as a game.

Perhaps business games can be defended as an introduction to the use of computers for a guide to management decisions. Personally, we feel that an introduction to successful "on the air" applications of scientific management in action—and there are many—would be much more productive for the business executive, and the computer manufacturer as well.

OFFICE AUTOMATION APPLICATIONS



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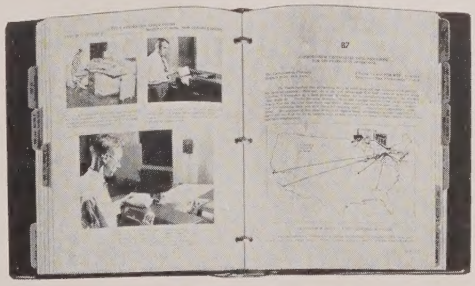

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